



The Ford plant in Canada on the bank of the Detroit river has 300,000 square feet of floorspace and made 25,000 cars in 1913

## Windsor—Canada's Detroit

### City Across the Detroit River is the Center of Automobile Industry in the Dominion—Has Eighteen Factories

By L. V. Spencer

**W**HEN Sieur de la Mothe Cadillac founded the city of Detroit some 200 years ago, he not only formed a community which at a far distant day was destined to become the center of the automobile industry, but one which would extend its influence so as to make the territory across the Detroit river the leading district in the Dominion of Canada in the production of motor cars and their parts.

In Cadillac's time, the whole middle portion of North America, embracing a large part of the United States and Canada, was the abode of savages. Later when the Detroit river became a part of the boundary between the United States and the Dominion, the community across from Detroit, which includes the municipalities of Windsor, Walkerville, Ford, Sandwich and Ojibway, became the Canadian counterpart of the Michigan city. And when in recent years Detroit grew to be the leading automobile city of the United States, it radiated some of its prosperity to its Canadian neighbors, so that today these municipalities, when taken as a whole, have assumed the distinction of being the center of Canada's automobile industry as well.

#### Really All One City

Though each of the five towns mentioned above has a separate charter, they are really all one city, in the practi-

cal sense, for the average stranger would be at a loss to determine just where one leaves off and the next begins. In speaking of Windsor, then, it is broadly taken to mean the whole manufacturing district across from Detroit.

Windsor is, of course, the main center of the group and has had a steady growth during the years since its incorporation as a town in 1858. This growth was nothing remarkable, but in 1892 it began to make records for itself in increases in population, building figures, customs receipts and so on. In that year it was incorporated as a city, and its really rapid growth commenced about the time the automobile industry began to grow. In 1909 there were 16,000 people, while today there are about 25,000.

#### Windsor a Logical Branch Location

American manufacturers, principally in Detroit, have come to regard Windsor as the logical location for their branch industries. There are several reasons for this: First, the quickest point to reach branch plants from the parent factories. Second, lowest freight rates are possible for the bringing in materials. Third, Windsor's strategic location with respect to the other cities of the Dominion and its facilities for transportation by water and rail to these points. Fourth, the climate is the mildest in the Dominion, since the city is the most southerly.



A portion of the Studebaker plant in Canada. It employs 200 men and has a schedule of 2,500 cars for this year



Plant of the Dominion Stamping Co., which makes fenders, mufflers, drop forgings



Factory of the Canadian-Detroit Lubricator Co., which manufactures lubricators and oilers. This building is a modern brick factory structure measuring 40 by 150 feet, and giving an area of 6,000 square feet

Windsor is really the logical gateway to the entire industry of Canada. It is almost midway between the eastern and western portions and thus freight rates are equalized. It is close to the great industrial centers of the United States and can thus serve a rapidly developing area of the Dominion which has one-third the extent of Europe. It has the advantage of the great lakes for water shipment, and five of the most important railroads of Canada enter its gates.

#### Eighteen Plants in Windsor

There are in this advantageous location eighteen plants which are in some way or other connected with the automobile industry, either devoting their entire plants to cars or parts, or manufacturing parts as a department of their business. These plants employ a total of 3,540 men at present, the list, together with the employees of each, following:

NAME OF PLANT	NUMBER OF MEN	PRODUCTS
American Auto Trimming Co.	253	Paint and trim bodies, and make dust covers and tops.
Canadian Commercial Car Co.	6	Motor trucks.
Canadian-Detroit Lubricator Co.	25	Lubricators, etc.
Canadian Lamp & Stamping Co.	100	Automobile lamps.
Canadian Winkley Co.	50	Grease cups and lubricating devices.
Dominion Stamping Co.	300	Fenders, mufflers, drop forgings.
Fisher Body Co. of Canada	270	Bodies.
Fisher Motor Co., Ltd.	30	Electric welding.
Ford Motor Co., Ltd.	1,800	Motor cars.
Gramm Motor Truck Co. of Canada, Ltd.	12	Motor trucks.
Hupp Motor Car Co.	155	Motor cars.
Kelsey Wheel Co., Ltd.	150	Wheels and body trimming.
McCord Mfg. Co.	25	Radiators.
New Dominion Motors, Ltd.	12	Machine work.
Penberthy Injector Co.	25	Brass goods.
Studebaker Corp'n (plant 7)	200	Motor cars.
Swedish Crucible Steel Co.	100	Steel castings.
Tate Electrics, Ltd.	25	Electric cars.
Total	3,538	

It will be noted that the Ford plant, the largest automobile manufactory in the British Empire, gives employment to about half the force chargeable to the Windsor industry.

Of these eighteen plants, no fewer than thirteen are connected with large American plants, most of which are located in Detroit. These thirteen cover nearly every branch of the motor car business, so that while the Americans do not export many of the finished parts going into the cars made in Canada, they have capital interested in such parts making. The following list gives the plants in Windsor which are connected with American factories:



## AMERICAN FIRM NAME

American Auto Trimming Co.  
 Detroit Lubricator Co.  
 Edmunds & Jones Mfg. Co.  
 Winkley Company.  
 Fisher Body Co.  
 Ford Motor Co.  
 Gramm Motor Truck Co.  
 Hupp Motor Car Co.  
 Kelsey Wheel Co.  
 McCord Mfg. Co.  
 Penberthy Injector Co.  
 Studebaker Corp.  
 Swedish Crucible Steel Co.

## CANADIAN FIRM NAME

American Auto Trimming Co., Ltd.  
 Canadian-Detroit Lubricator Co.  
 Canadian Lamp & Stamping Co.  
 Canadian Winkley Co.  
 Fisher Body Co. of Canada.  
 Ford Motor Co., Ltd.  
 Gramm Motor Truck Co. of Canada.  
 Hupp Motor Car Co.  
 Kelsey Wheel Co., Ltd.  
 McCord Mfg. Co.  
 Penberthy Injector Co.  
 Studebaker Corp. of Canada, Ltd.  
 Swedish Crucible Steel Co.

Looked at from the workman's standpoint, the Americans are really responsible in a large measure for the giving of employment to most of the workers in the factories allied with the motor vehicle industry of Windsor. That is, the plants which have American connections employ about 3,165 of the total of 3,540. However, the fact must not be lost sight of that if Canada did not furnish the market for the vehicles, the plants could not operate, hence it resolves itself into a Canadian industry, no matter whose capital is back of it.

## To Make 30,500 Cars and Trucks

The Canadian factories across from Detroit this year have a production schedule of approximately 30,500 passenger motor cars and over a hundred trucks. This does not seem a large output to the American public, which this year will take over 500,000 cars, yet it is in proportion to the growth of the Dominion, of which the United States has had a much earlier start.

Of this output, the Ford Motor Co., Ltd., is responsible for 25,000, or about five-sixths. At this time the big plant is operating on a schedule of 100 to 110 cars a day, which is also making things hum at the other plants supplying parts.

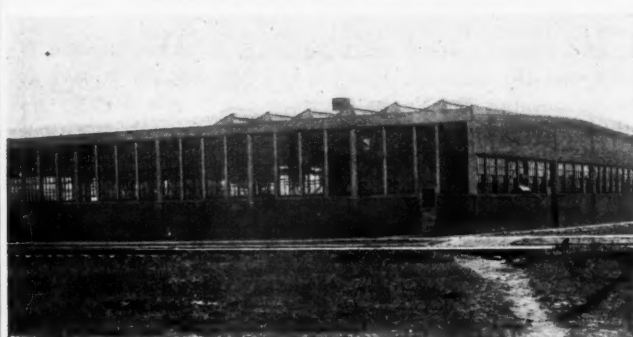
Like the other plants, that of the Ford company is not very old. It had its inception 10 years ago, and at that time was really an experiment, for although the Ford car was well enough received in this country there was no telling how it would be regarded by the trade of the Dominion. Therefore, the first output was largely made by assembling parts which were imported from Detroit.

It was soon discovered that Fords could be successful in Canada, so arrangements were gradually made to manufacture everything on the Canadian side. A thoroughly up-to-date plant was erected and machinery installed on a large scale for this purpose.

The Canadian Ford company was organized in August, 1904, shipped its first car by express in February, 1905, and the entire sales for 1905 amounted to \$110,000. The sales of 1912 amounted to \$4,500,000. The growth of the plant from its beginning reads like an industrial fairy tale. The



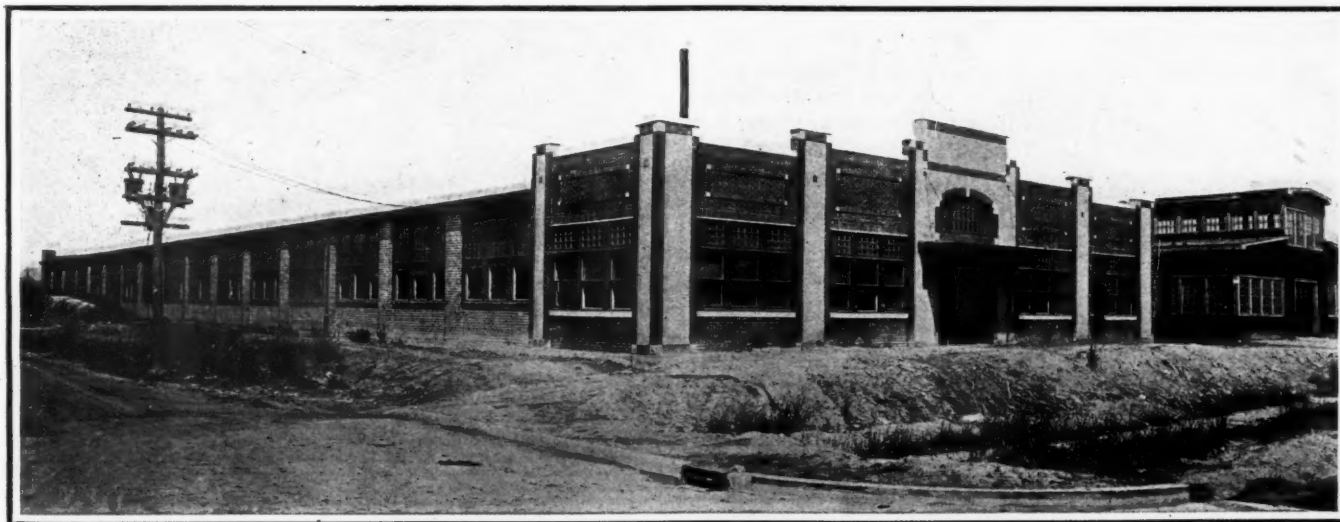
One of the factories of the Kelsey Wheel Co. which supplies wheels to Ford, Hupp and Studebaker



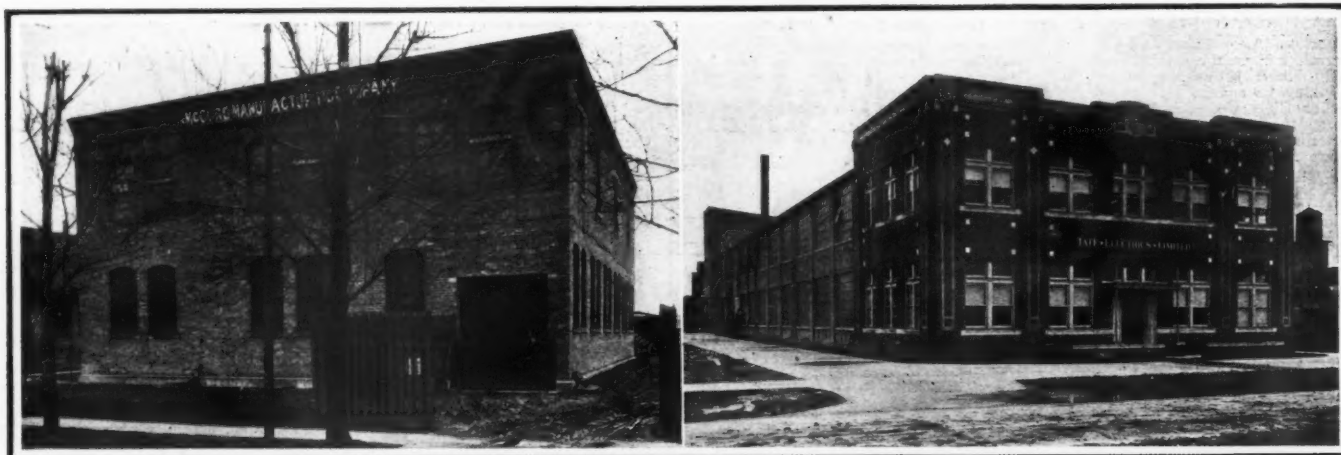
The Canadian Winkley Co. has a new factory 100 by 100 feet. It makes lubricating devices, grease cups, etc.



Plant of the Fisher Motor Co., Ltd.; only electric welding is done here. Fisher automobiles are manufactured at the main plant at Orillia, Ont.



Spacious factory of the Hupp Motor Car Co., Windsor, Ont. Note the big window space provided for adequate lighting



Left—Canadian factory of the McCord Mfg. Co., which makes about 500 radiators a month for its Canadian trade. Right—New plant of the Tate Electric, Ltd., the only maker of electrica in Canada

two and one-half story brick building of 34,000 square feet which was the nucleus around which the 300,000 square feet now comprising the Canadian Ford company's factory were built, contained a single drill press as its only machinery. In 1905 sixteen employees built 114 cars, while the following year saw the output of 201. Two lathes took their positions along with the drill press and the machine shop could then be known by that name.

In 1907, the Ford demand was greater, and 327 cars went forth, while the following year about the same number were built. In 1909, which saw the manufacture of the first model T, the present model, 486 cars left the factory. Of course, these increases necessitated more machinery, about half the parts being machined in the Canadian plant, motors and the rest of the parts coming from Detroit. Twelve hundred Fords were made in 1910, and in this year the old main building was torn down and gave place to the 19,000 square foot three story concrete structure which was completed in January, 1911.

#### Branch To Make 25,000 Fords in 1914

The following year when the output was doubled over 1910, the four-floor reinforced concrete structure which projects out over the river to just inside the channel bank and contains 60,000 square feet of floor space was begun, and completed in 1912. During that year the Ford shops made and shipped 6,500 model T's, while expansion of plants went on. In 1913 the output was about 16,000 cars, and for 1914, the schedule of 25,000, will readily be taken care of by the sales force. The 1913 output was more cars than the parent Ford plant in Detroit had turned out 4 years previously.

#### Other Companies Active

The Studebaker Corp. in 1909 established a Canadian plant which is operating with about 200 men and has a schedule this year of 2,500 cars. It occupies a three-story brick plant convenient to the railroads. This is known as plant No. 7 of the Studebaker group and is under direct control of the American factory of that name. Since its inception, the plant has shown an increase of 400 per cent. in production, the first year's output being about 500 cars. 1912 showed 1,200 produced. This plant supplies Canada only.

With a floor space of 20,000 square feet, the Hupp Motor Car Co. is now operating in its new plant completed last year. The concern had Canadian representation in 1911, however. Today it is operating with 155 men and produces a dozen cars a day, or about 3,600 this year.

The Gramm Motor Truck Co. is producing about two trucks a week with a working force of about twelve men in a two-story brick plant. The Gramm company started this Canadian plant about 4 years ago, and though the truck industry is still in its early infancy in the Dominion, reports

bright prospects. The plant has about 10,000 square feet of floorspace.

The Canadian Commercial Motor Car Co. is also moving along conservatively with an output of about twenty-five trucks a year. This is the oldest truck firm actually building vehicles in Canada, it is said, and its plant has dimensions of 40 by 200 feet and is a brick structure, part of which is two stories high.

#### Only One Electric Maker

The Tate Electrics, Ltd., is the only electric vehicle maker in the group and occupies a spacious brick building 50 by 400 feet. This concern is just getting under way, but reports a good working schedule in the near future.

Among the parts makers, it may be said that most of their activities are confined to the making of the various parts used by the car builders who are also operating in Windsor and its environs. To supply parts for 30,000 vehicles this year, however, makes a nice business for these branches.

#### Many Accessory Companies

The Canadian Lamp & Stamping Co. makes for the motor car trade, lamps, which business forms about half of its ac-



Upper—Factory of the Canadian Commercial Motor Car Co., which is the oldest truck firm in Canada. Lower—Plant of Canadian Lamp and Stamping Co., which manufactures lamps





Left—The Grammm Motor Truck Co. factory, which is producing about two trucks a week. Right—Plant of the American Auto Trimming Co., which paints and trims bodies principally for Ford and Hupp in Canada

tivity, plumbing supplies being also manufactured. The plant is a one-story brick, 50 by 225 feet.

The Dominion Stamping Co. has a four-story brick and concrete building, 40 by 200 feet. It produces for automobile factories only and makes fenders, mufflers, drop forgings and the like.

The American Auto Trimming Co. was located on the Canadian side 3 years ago and paints and trims bodies principally for Ford and Hupp. It occupies a modern three-story brick plant 183 by 280 feet in size, plus a one-story brick warehouse.

McCord Mfg. Co. is turning out about 500 radiators a month for its Canadian trade in a 12,000 square foot two-story brick plant.

The Canadian-Detroit Lubricator Co. is concerned with the production of lubricators and oilers and occupies a one-story brick factory building 40 by 150 feet in extent.

The Kelsey Wheel Co. has two buildings. One is a two-story brick, 60 by 360 feet while the other is a one-story 50 by 300. The concern supplies wheels to Ford, Hupp and Studebaker and also does body trimming.

The Canadian Winkley Co. is located in a new factory of

mill construction which measures 100 by 100 feet. It makes lubricating devices and grease cups and the like, supplying all the motor car factories of Windsor and its environs and also other classes of trade.

The Fisher Body Co., which started its Canadian plant in Sept., 1912, makes bodies principally for Ford and Studebaker and occupies a spacious plant of three stories and measuring 200 by 400 feet.

The Penberthy Injector Co., which makes brass specialties, has a two-story brick plant, 160 by 200 feet.

In its plant across from Detroit, the Fisher Motor Co., Ltd., does only electric welding, the making of the Fisher cars being done at the Orillia, Ont., plant.

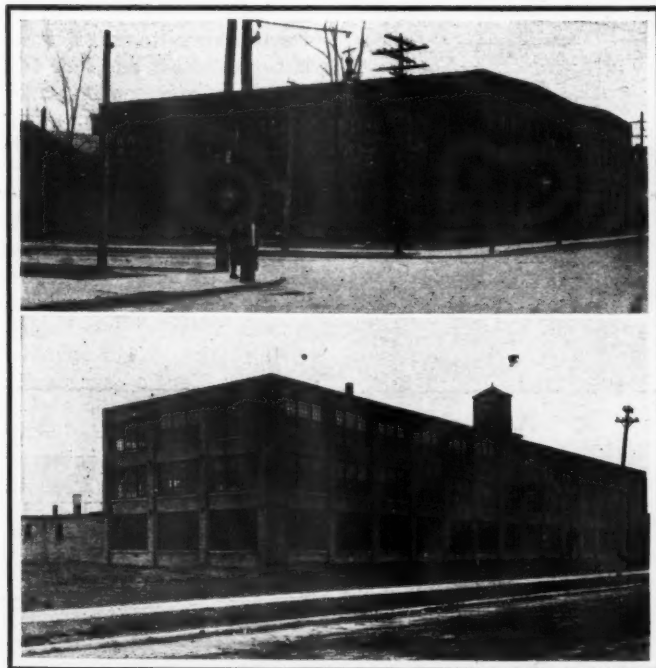
With this list of thriving automobile and parts making plants the Windsor section is started on the way to becoming one of the great manufacturing centers of the rapidly awakening Dominion. Most of the concerns have all the backing they need and through their connections with successful concerns on the American side are provided with the best there is in the way of manufacturing direction and support. The products which they are turning out are not of the experimental type, but are ones which have been through the mill and have satisfied an exacting American public before they went abroad.

#### Not a Temporary Development

Thus, Windsor's foundation as a motor car city is solid, for its plants are there to stay. They have started at the time when the Canadian automobile industry is in its infancy, and they will grow as Canada grows. With the increase of good roads, the extension of motor car use will be but natural, and there is no reason at all why the Dominion should not take its place as one of the great touring grounds of the continent.

Late census figures show about a dozen establishments in all of Canada engaged in the making of automobiles, and about as many more which devote their energies to the production of parts. There are no doubt a number more since these figures were compiled, but the one fact stands out that the community across from America's automobile manufacturing city is in the lead with considerably over half of the Dominion's entire automobile manufacturing firms.

There is another advantage to the manufacturer in Canada which has not been lost sight of. Export trade conditions are favorable due to tariff regulations with foreign countries, and more especially with those of the British empire, which can hardly be classed in the foreign list. The car makers now operating in Canada have taken advantage of this, and the Ford company, as an example, ships its cars from the Canadian plant to various British possessions outside the British Isles. The Willys-Overland plant at Hamilton, Ont., is now beginning regular production.



Upper—Penberthy Injector Co., factory in Windsor which makes brass specialties. Lower—Factory of the Fisher Body Co. in Canada, which makes bodies principally for Ford and Studebaker.



Governor addressing the crowd of 6000 people at Mooseheart, Ill., during the Illinois Good Road Day, April 15

## Better Highways for Illinois

### Governor Leads Campaign on State's First Big Road Day

CHICAGO, ILL., April 15—Tugging on the ropes of state pride, civic patriotism and Yankee common sense, Governor Edward F. Dunne started the herculean task of pulling Illinois out of the mud today. After a 134-mile motor trip across six of the northern counties of the state, starting from Chicago, ending at Sterling and following the Lincoln highway the greater part of the way, the chief executive came to the conclusion that there was an ingredient other than mud that required immediate elimination. That was dust—dust that covered his Hibernian features, made hoarse the voice that was raised in the interest of improved highways and settled in clouds on his escorting party of seventy-five state, county and city officials, who were just as enthusiastic as he.

#### Day of Work and Speeches

Despite this dust, however, Illinois' good roads day was a success. It was a day of work and speech-making. Farmers were out on the highways with split log drags and competing for prizes offered by motoring, good roads and civic organizations. Work was started on the first road to be built under the new Tice law providing for state aid. In the small towns and cities through which the governor's party passed, citizens gathered to learn of Illinois' shame in the matter of good roads and of the plans for pulling the state out of the mud.

From sunrise to sunset, the gospel of good roads was preached by Governor Dunne, Speaker William McKinley,

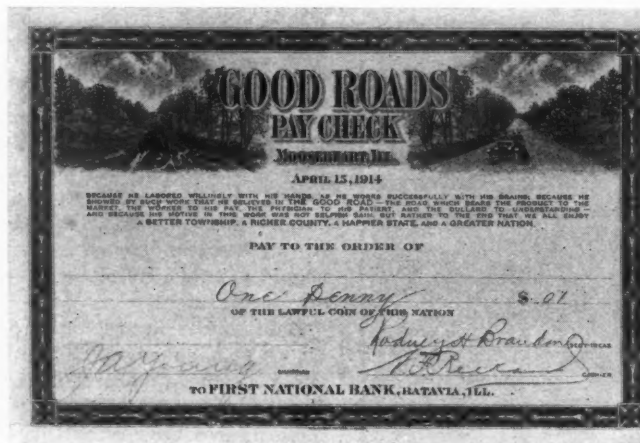
of the Illinois state legislature, members of the state highway department and other disciples of highway improvement. The governor and his party, under the guidance of officials of the Chicago Motor Club and forming a line of fifteen touring cars, started from Chicago at 6:30 o'clock in the morning. Maintaining a schedule calling for a speed of

25 miles an hour and inhaling dust for over 12 hours, the missionaries stopped at twenty towns to make good roads addresses and hail the new era of highway improvement in the state. The towns were decorated with American flags and bunting, in many places brass bands welcomed the governor with martial music and all along the way there was evidence that gangs of men had been at work a day or two before getting the highways in readiness for a successful trip across the state.

At least 50,000 residents of northern Illinois gathered at points along the route to

pay homage to Governor Dunne and boost for good roads. The enthusiasm shown was very encouraging and presages future work with pick and shovel, drag and grader. And the enthusiasm was genuine. Political differences were forgotten and Democrats, Republicans and Progressives joined in hailing Edward F. Dunne as "the first good roads governor of Illinois."

Governor Dunne's activities were not confined alone to speech-making. At Mooseheart, 4 miles north of Aurora, he discarded coat and hat, rolled up his sleeves and turned the



Pay check for 1 cent given to each of the volunteer workers for good roads in Illinois



first shovelful of earth on a stretch of road that is to be constructed of concrete under the state aid plan. Mooseheart, which is the site of the industrial school for boys that is being erected by the Loyal Order of Moose, was the storm center of enthusiasm in northern Illinois. More than 5,000 residents of Aurora, Elgin and the surrounding towns gathered there to voice their support of a worthy cause. More than 500 men from all walks of life were on hand to labor with pick and shovel. When the governor's party arrived, they were formed in a long line and in passing he construction camp

shanty were given a union labor card, signed by Samuel Gompers, and a pay check for 1 cent. According to the inscription thereon, the latter was given each of the volunteer workers.

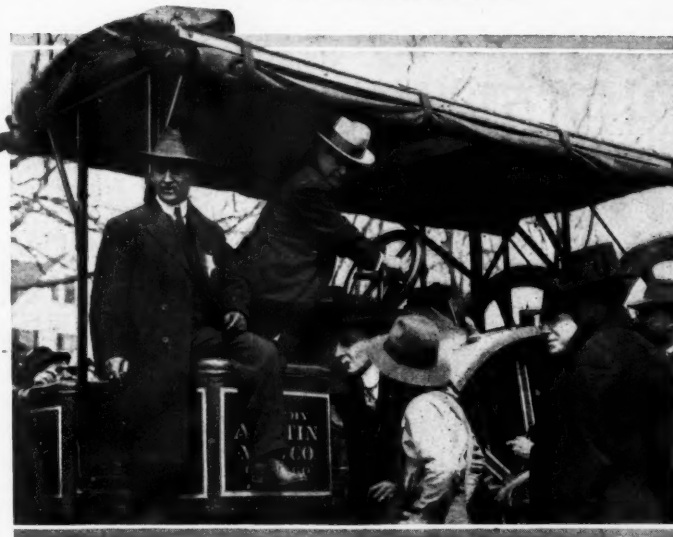
"Because he labored willingly with his hands, as he works successfully with his brains; because he showed by this work that he believed in the GOOD ROAD—the road that bears the product to the market, the worker to his pay, the physician to his patient and the dullard to understanding—and because his motive in this work was not selfish gain, but rather to the end that we all enjoy a better township, a richer county, a happier state, and a greater nation."

#### Pay Checks Signed by the Governor

These pay checks were signed by the governor, who spent a very strenuous hour of shovelling, speech-making, signature affixing and steam roller guiding.

Governor Dunne made his debut as an actual road laborer before reaching Mooseheart. At the Joy Morton farm, 12 miles west of Chicago where twenty men were dragging the road, the state executive grabbed a rake and loosened up his muscles for more strenuous work to come.

Wheaton, Aurora, Mooseheart, Batavia, Geneva, Elburn, La Fox and Sycamore were the points included in the morning itinerary. At De Kalb, the noon stop, where the governor and his party were entertained at luncheon by the local com-



Governor Dunne steering a steam roller at Mooseheart

mercial club, an inspection of a mile of concrete road was made and the students of the state normal school turned out to greet the good roads disciples. From De Kalb, the route led through Cortland, Malta, Creston, Rochelle, Ashton, Franklin Grove and Dixon. The trip terminated at Sterling where a good roads meeting was held in the opera house in the evening.

Although Governor Dunne spent very little time in Cook county, work did not lag in the vicinity of Chicago as a consequence. The celebration of good roads day resulted in the improvement of more than 500 miles

of highways in this vicinity. More than 100 contestants took part in stone-hauling and dragging contests held at Desplaines, Chicago Heights, Wheeling and Blue Island from midnight Tuesday until 10:30 o'clock this morning. The contests were held under the auspices of the Associated Roads Organizations of Chicago and Cook County which hung up cash prizes amounting to \$200 in each of these towns.

#### Convict-Crushed Stone Used

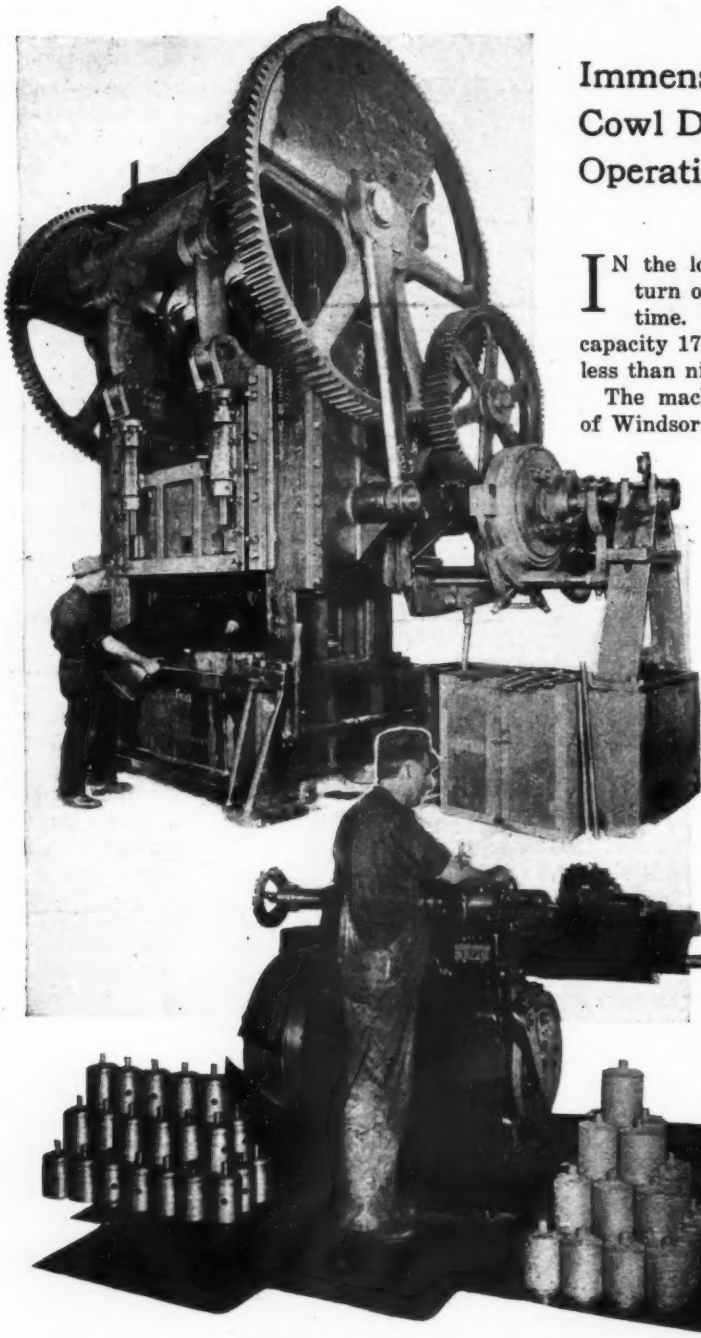
In addition at each of these towns cash prizes were awarded persons volunteering the use of teams and motor trucks for the hauling of crushed stone, crushed by the convicts of the Joliet penitentiary working under the honor system and sent by Warden Allen to each of these four points. LaGrange also had a stone-hauling contest promoted by the LaGrange Motor Club and the good roads organization. In several of the townships of Cook county good roads day was observed in the rural schools and many of the pupils took part in the road dragging.

Illinois' good roads day marked an epoch in the history of the state. It marked the beginning of actual work under the Tice law, passed by the legislature in July, 1913, and going into effect April 1, 1914. This law is generally considered one of the best statutes for encouraging highway improvement in the country.



The Governor addressing the noon meeting of good roads enthusiasts at De Kalb, Ill.

# Automatic Makes 85 Pistons a Day



**Immense Toggle Press Used in Making Jeffery Cowl Dashes Can Finish One Cowl in a Single Operation and Requires But 1 Minute for Each**

**I**N the lower illustration is shown an automatic machine which can turn out eighty-five pistons a day and use only one-half of a man's time. One man runs two of these machines, making his working capacity 170 pistons every day. The machine works at the rate of just less than nine pistons every hour, or one in 7 minutes.

The machine shown is manufactured by the Windsor Machine Co., of Windsor, Vt., and is known as a Gridley semi-automatic. The installation shown is at the National Motor Vehicle Co.'s plant at Indianapolis, Ind.

The blanks which are shown piled near the machine require four operations. The rings and piston skirt have to be turned and the head and base machined. These operations are all done simultaneously and when one machine has finished one-half of its work the other is ready to be set up again by the man who handles a pair of the machines. There is a space, then, of 3.5 minutes between each setting up operation and the next, during which time the workman can give attention to the running and lubrication of the machine.

## Jeffery Cows from Giant Toggle

In making the cowl dashes used on the Jeffery cars in the plant at Kenosha, Wis., a large double-toggle press weighing 93 tons is employed. This press has a capacity of 1,500 tons or 3,000,000 pounds. The press is shown in the upper illustration on this page.

To transport the press to the works of the Jeffery plant required the combined capacities of six freight cars. The dies used in it were made at the Jeffery plant and required the combined efforts of two skilled die makers for a space of 105 days, working 10 hours each day. The press is operated by a direct-connected electric motor and by its use one cowl can be finished in a single operation. The average length of time required to make a cowl is a minute.

The tendency to crown the fenders of the car and to make them of heavier and more substantial material also necessitates heavier machinery for this branch of the sheet metal work of the car then has heretofore been used. The sheet metal work can run up to an enormous proportional part of the cost of manufacture if the pressing is not done quickly and with the smallest possible number of men. Quick work means heavy machinery. This is true whether it is in the sheet metal room or the lathe where weight is required to hold the alignment against the strains attending high speed cutting of heavy material.

## Special Machines for Cowl and Piston Work

In the upper view is shown the giant double toggle press used for making the cowl of the Jeffery cars in the plant at Kenosha, Wis. The capacity of the press is 3,000,000 pounds. The weight of the press is 93 tons.

The lower illustration shows the automatic machine used in the National Motor Vehicle Co.'s plant at Indianapolis, Ind., for making pistons. This machine simultaneously turns the rings and piston skirt and machines the head and base. It can turn out eighty-five pistons a day. The pile of blanks and finished pistons is shown in the illustration to the left and right of the machine.

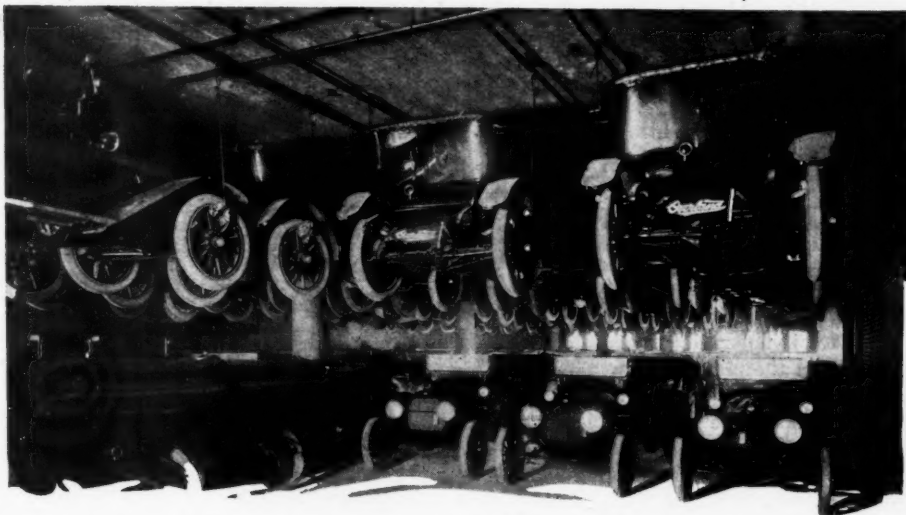
Operated by a direct-connected electric motor, this press can shape a Jeffery cowl every minute, or in a 10-hour day would approach an output of 600 cowl. It took the combined efforts of two skilled die makers 1,050 hours to make the dies for the machine. These dies were made at the Jeffery plant



# Using the Ceiling for Storing Cars

St. Louis Overland Dealer Finds Novel Way of Utilizing His Waste Space

**S**T. LOUIS, MO., April 18—Automobiles hanging from the ceiling as would a spider, constituted the surprise shown St. Louisans by T. L. Hausman, president of the Overland Automobile Co. here, when he opened his new building on Locust street last month. When the company was building the home it now occupies, Mr. Hausman was busy trying to figure a way to accommodate at least 300 automobiles at one time. It was impossible with



Section of garage, showing cars on both floor and ceiling, cars suspended by cables

the floorspace at hand, so Mr. Hausman set his ingenious mind to work. He soon found that much space was being wasted overhead. Then came the idea to hang the machines from the ceiling.

## Steel Runners in the Ceiling

Large steel runners were poured into the ceiling when the building was under construction and to these were attached hangers which also were made of the heaviest steel. A steel cable of  $\frac{3}{4}$ -inch thickness forms the other part of the device, which since has been a point of much interest to garage owners and automobile men throughout this section of the country, many of whom have asked Mr. Hausman's permission to use the device in their buildings.

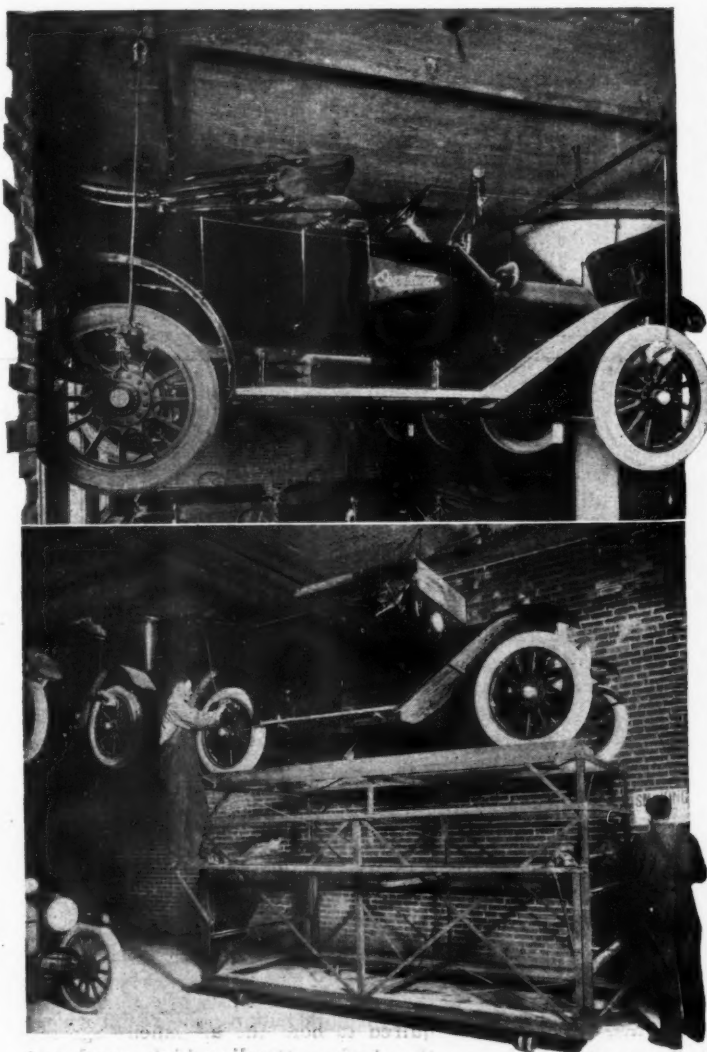
When an automobile is driven into the garage it is run on an elevator from which it is transferred to a traveling table that can be pushed to any desired place in the building, three men comprising the crew. The upper section of this table can be adjusted and raised to any height by a series of sprockets and worm wheels, which also were devised by Mr. Hausman.

## Upholstered Boards Protect Cars

When the automobile is ready to be hung, the steel cable is run through the hangers and then through the wheels of the automobile, which are protected by a heavy board which is adequately upholstered. The steel cables then are fastened with an equally secure catch. The cables are tested each day to a strain of 1,550 pounds, before an automobile is hung. This is only one feature of the building which is in all other respects very up-to-date and modernly equipped.

## Motorists in Safety Patrol Squads

**MILWAUKEE, WIS., April 16—**Under a plan evolved by the Milwaukee Public Safety Commission, a voluntary organization of citizens to aid in the prevention of all kinds of accidents, street traffic, and particularly motor car traffic, will be much improved in Milwaukee this year. One hundred motorists who have been proven law-abiding and careful drivers will be selected to do patrol duty. Each member of the special committee will carry an insignia on his car in the form of a disk containing the letters T. P., which stands for Traffic Protection.



Upper—Method of suspending cars. Lower—Movable table

# Lighter Parts Increase Power

## Automobile Manufacturers Have Experimented with Light-Weight Pistons and Connecting Rods

THE entire momentum of the reciprocating masses of an engine has to be reversed twice in every revolution. This fact alone would seem to indicate that the work done in overcoming this momentum should be as small as possible because it is not actually used in transmitting power to the road wheels. The only way to reduce the momentum of a mass for any given velocity must naturally be in the reduction of the weight of the mass.

There is no engineer who does not admit that unnecessary weight in the pistons and connecting-rods of an engine means the consumption of unnecessary power, but there are others who do not believe that a lowering of the weights used in present-day engines would be accompanied by an appreciable increase in the efficiency or power of the engine. These engineers, however, are in the minority, the majority believing that a still greater reduction in weight would be of advantage. To this end we find many of the large concerns experimenting with steel or aluminum pistons and connecting-rods of lighter section or material.

There are three advantages to be gained by reducing the weight of reciprocating parts. These are, the decrease in vibration, the decrease in inertia to be overcome and the decrease in the friction.

Regarding the lowering of the amount of vibration in a car due to the use of lighter reciprocating parts little has to be said. While the rotary functions of the motor can practically be put in perfect running balance the secondary moments of reciprocating parts are never equalized. In fact, four-cylinder engine balance is so crude as regards the complete balancing of the reciprocating parts that there is always a large moment which, while not noticeable at low speeds, becomes exceedingly objectionable at higher speeds. The weight of the reciprocating parts is, of course, a direct factor in the amount of vibration, and therefore many makers claim that leaving all other considerations aside a decrease in weight for the sake of cutting down vibration is sufficient justification for extensive experiments tending to effect this change.

### Abbott Company Experiments

Of particular interest in this connection are the experiments of the Abbott Motor Car Co., of Detroit. During the past 5 years this concern has been directing a considerable amount of attention towards the lightening of the reciprocating parts used in the motors manufactured for their cars.

In the words of M. J. Hammer, engineer of this concern, remarkable results have been obtained in the way of better performance for motors equipped with the lighter parts, and these results have been attained, to his belief, principally through the elimination of friction and vibration. A large amount of data has been accumulated by this concern, which, when boiled down to a final analysis of the subject, enables the Abbott concern to state that by reducing the weight of the reciprocating parts on an average of 20 per cent. during the last 3 years that records of tests show an increase of power of from 12 to 18 per cent. in the motors used in Abbott cars at high speeds and a very considerable increase at the average operating speeds.

William R. Gordon, engineer of the Hazard Mfg. Co. of Rochester, entertains the same views on the effect of the reduction of the weight of the reciprocating parts on vibration.

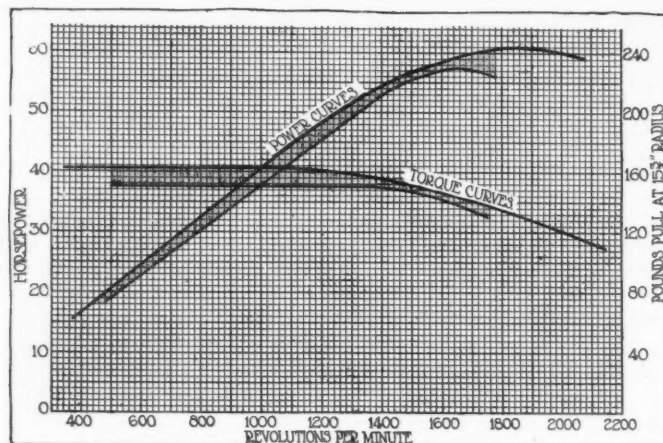


Fig. 1—Curves showing increase in power and torque due to reducing weight of pistons and connecting rods on a six-cylinder 3.75 by 5.5 Buda motor

This concern also has made a series of experiments on lighter parts and in its 1914 models, which are 3.75 and 4 inches bore by 4.5 inches stroke, the pistons have been lightened to 12 ounces below the weight used in the 1913 and previous models. The weight of the piston complete with pin and rings in the 4-inch motor is 2 pounds and 14 ounces. In the 3.75-inch motor it is 2 pounds and 12.75 ounces. The Hazard company believes that these pistons are as light as is practical commercially with cast iron. Mr. Gordon states that there is a great difference in the vibration of these two motors at speeds above 1,000 revolutions per minute, as compared with the previous models. This reduction in vibration of course carries with it an increase in power as vibration is a direct loss.

In stating an opinion gained through long experimenting on lighter parts, Mr. Gordon states that the Hazard company has been successful in creating a gain in power, flexibility and rapid acceleration due to light parts. The reduction by 12 ounces of the weight of the pistons in the 1914 models has made a marked increase in freedom from vibration.

### Inertia Forces Important

The tendency of a body to remain in motion or in a state of rest unless acted upon by some outside force is known as inertia. Inertia acts against the operation of the reciprocating parts of the motor at all times, but the times of greatest stress are at the top and bottom of the stroke when the moving reciprocating parts must be brought to rest and again accelerated in the opposite direction. These reversals in the direction of momentum would alone put considerable pressure on the bearing surfaces at the upper and lower ends of the connecting-rod without any consideration of the force due to the explosion of a charge in the cylinders.

By reducing the inertia forces it is possible to run the motor at much higher piston speeds. A test recently reported where a four-cylinder motor was first fitted with cast iron and then with aluminum pistons brings out this statement very clearly. This motor was a four-cylinder, 80 by 120 millimeter size and the results were noted as shown in the curve given in Fig. 2. As will be seen, with the aluminum pistons the maximum power was attained at about 1,900 revolutions per minute, while with the cast-iron pistons it was obtained at about 1,600. At 1,600 revolutions the power was a little over 20 with cast iron and over 22 with aluminum. The maximum for the cast iron was a little over 20 and for the aluminum more than 23.

### Lightness Possible with Cast-Iron Pistons

It is not necessary to go to aluminum pistons in order to see a difference in results through making the reciprocating parts lighter. The Buda company of Harvey, Ill., maker of



a large number of gasoline engines for automobiles, has recently reduced the weights of the pistons and connecting-rods to a point which they believe is about as light as they can be made in cast iron and by drop-forging without weakening the motor. The reduction in weight of pistons on a six-cylinder 3.75 by 5.5 Buda motor has resulted in the gain of power and torque shown in the accompanying illustration, Fig. 1. The shaded areas in this illustration indicate actual power and torque gain. It will be noted that while the maximum power of this engine was formerly attained at 1,600 revolutions per minute, it now reaches its maximum power at 1,875 revolutions per minute. The maximum power with the former pistons was 57 horsepower; it is now 61. The torque pull on a given radius as shown in the curve has also gone up a corresponding amount.

#### Friction Must Be Considered

The ability of the motor to run at higher piston speeds with the lighter reciprocating parts is due to two factors. First the reduction of the inertia forces, and second the reduction in friction. The fact that the inertia forces are reduced for any given speed is alone sufficient to show an increase on the horsepower chart. This gain in horsepower is not only due to the fact that less work has to be expended in overcoming the inertia directly, but it is also due to the fact that the lighter parts give a reduced unit bearing pressure, and hence less loss through frictional bearing losses.

It has often been said that the life of a motor when considered at its average speed, is governed by the number of motion reversals. That is, the number of times it is required to reverse the direction of motion of the piston. This has been one of the points which has been brought forward in arguments for the long-stroke motor, in that for a given piston speed fewer reversals of motion are given. The same result, however, of reducing the number of reversals is given in reducing the effect of them and this is accomplished by a lightening of the reciprocating parts. It therefore would seem to follow that lighter parts mean longer life.

It cannot be figured that any great gain due to the reduction of frictional horsepower will result from lightening the weight of reciprocating parts. The biggest gains are in the reduction of vibration and in the increase of maximum speeds. In commenting on lighter parts J. O. Heinze, engineer of the Northway Motor Co., of Detroit, states that, as regards friction, it is only possible to make a very slight reduction. In actual figures Mr. Heinze estimates that, by reducing the weight of the reciprocating parts to the utmost, a difference of 20 per cent. in weight would be the greatest possible and that this would make a difference of about 10 per cent. in the internal friction of the motor. Following this further he states that the internal friction of the motor is about 20 per cent. of the indicated horsepower of same and therefore a reduction of 10 per cent. of the 20 per cent. of friction losses would only produce a very small gain in output.

#### Large Factor of Safety Necessary

Mr. Heinze states that a reduction of more than the 20 per cent. would weaken the strength of the pistons and connecting-rods to a dangerous extent and that further the internal friction of the motor is not only due to the bearings affected but that piston-ring friction and other friction factors also enter the problem. The Northway company has experimented with steel pistons and taking into consideration the cost of production, wearing qualities, general durability and the treatment that motors get in the hands of the general public, such as the practice of carrying too early a spark, producing excessive strain on the piston and connecting-rods, has resulted in the use of a large factor of safety and therefore heavier parts than would be used could these factors be omitted.

The Buick Motor Co. says that the difference between

ordinary service pistons and lighter ones is so little as regards power output that experiments in their testing laboratory show no appreciable gain in horsepower for the lighter weights, nor did the heavier pistons, up to practical service weights show any loss of power. The Buick company states that in their belief if the proper balance is retained between the various reciprocating parts there is but little to be gained by the decrease in weight assuming that the original weights have been well founded on practical road experience.

#### Heavy-Duty Motors Affected

While in light high-speed work it has always been the tendency to keep the weight of all moving parts down to the lowest possible limit, it is a fact that makers of heavy-duty engines operating at speeds of about 1,000 revolutions per minute have in the past altogether underrated the value of lighter parts. Heavy-duty designers have often gone ahead with the idea so firmly fixed in their minds that the engine was to be adapted for heavy duty only that the virtue of lightness has failed to be realized. Within the past 3 years this condition has undergone a change. An example of this is the Waukesha Motor Co. of Waukesha, Wis., which has been cutting the weights used in heavy duty engines during the past few years. It is the belief of this concern that the making of pistons and connecting-rods lighter reduces the wear considerably on certain parts of the crank bearings. Its engineers state, in fact, that their experience is that the effect of the reciprocating forces, added to the wear caused by gas pressures, is the most important factor of long life in the crankshaft and crankshaft bearings, and it is from this angle of life, that they are chiefly interested in the reduction of weight of pistons and connecting-rods. They find that this is of great importance even at as low speed as the 900 revolutions per minute, at which most of their heavy-duty motors are functioning.

The Waukesha company also states that where the valve areas are sufficient, they find the effect of the lightening of the reciprocating parts to give almost unlimited increase in power, due to the increased maximum motor speed as well as reduction in bearing pressure.

#### Valve Design an Important Feature

The factor of valve area and, in fact, valve design in general, is important in the consideration of higher speeds because, it must be remembered, the reciprocating speed of a motor is not only limited by the inertia of the reciprocating parts but it is also controlled by the fact that there is a tendency to wire draw the charge after certain speeds. For this reason we find racing motors built with a plurality of valves as well as the lightest possible piston and connecting-rods.

Those who have experimented with lighter pistons and  
(Continued on page 887)

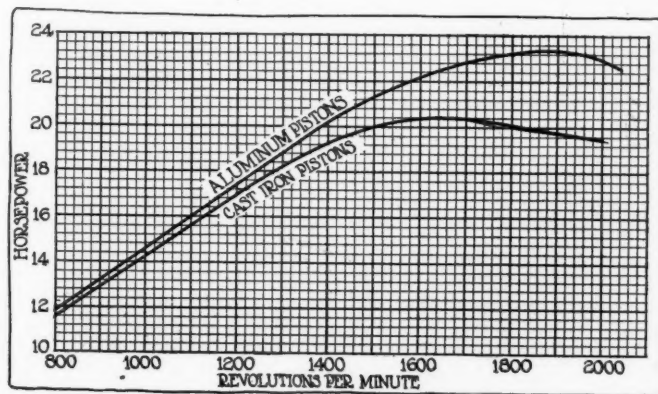


Fig. 2—Comparative curves obtained with aluminum and cast iron pistons on an 80 by 120 millimeter four-cylinder motor

# Using Dry Cells Efficiently

## The Automobile Engineers' Forum

### Makers of Dry Batteries Have Aimed to Make Product Foolproof—Influence of Single-Spark Ignition Systems—The Multiple Battery

By F. A. Strauss  
National Carbon Co.

CLEVELAND, O.—Editor THE AUTOMOBILE:—The general adoption of generator-storage-battery starting and lighting systems has caused an interesting development in automobile ignition. A year or 2 ago, when the electrical equipment of the majority of cars consisted merely of some standard type of magneto-battery dual ignition system, the dry cell seemed destined to become a negligible factor as far as automobile service was concerned, yet strange as it may appear, the advent of the present-day electric automobile equipment has changed this situation completely. A number of successful starter manufacturers have found the dry cell to be the most dependable auxiliary source of current.

At the same time, several single-spark ignition systems, such as the Atwater-Kent, Delco, Noxon and Rhoades, depending in many instances wholly on dry cells, have been brought to a high degree of perfection.

One or the other of these systems is used on almost every American cyclecar, and here the question of weight almost precludes the use of any battery other than dry cells.

#### Dry Cells Designed to Be Foolproof

As is only natural, dry cells are usually regarded simply as a means to an end. In the early days of automobiling, as long as everything ran smoothly the humble battery received no thought or consideration, but when trouble was experienced the dry cell usually was blamed and received

much undeserved abuse. This attitude, combined with misuse and mishandling, has caused many prejudiced motorists to condemn dry cells unjustly. Realizing these conditions the manufacturers of dry cells have designed them so that the minimum of precaution need be taken in installing and caring for them. The up-to-date motorist nevertheless should have some knowledge of the fundamentals of dry cell theory and operation in order that he may obtain the most efficient service from them.

The dry cell, like any other type of primary battery, is a device for transforming chemical energy into electrical energy. A dry cell reduced to its simplest form consists of an electrode of zinc, commonly called the negative electrode, a carbon or positive electrode, and a salt-solution or electrolyte. The salt commonly used is sal ammoniac or ammonium chloride,  $\text{NH}_4\text{Cl}$ .

The zinc electrode is made in the form of a container or can; the carbon electrode in the form of a rod fixed in the center of the cell. The electrolyte is absorbed by the "mix" and lining, which fill the space between the can and the carbon. The nature and function of the lining and mix will be explained later. For the present, their action will be disregarded.

Fig. 3 shows such a cell diagrammatically. If the carbon and zinc are connected through an external circuit, a current will flow from the carbon to the zinc. This current is produced by chemical action within the cell. These chemical reactions are very complicated and their exact nature is not fully understood. For the purpose of this discussion it is sufficient to state that the zinc goes into solution in the electrolyte, and that hydrogen is liberated at the carbon electrode. The hydrogen clings very tenaciously to the electrode, and since it is a non-conductor it greatly increases the

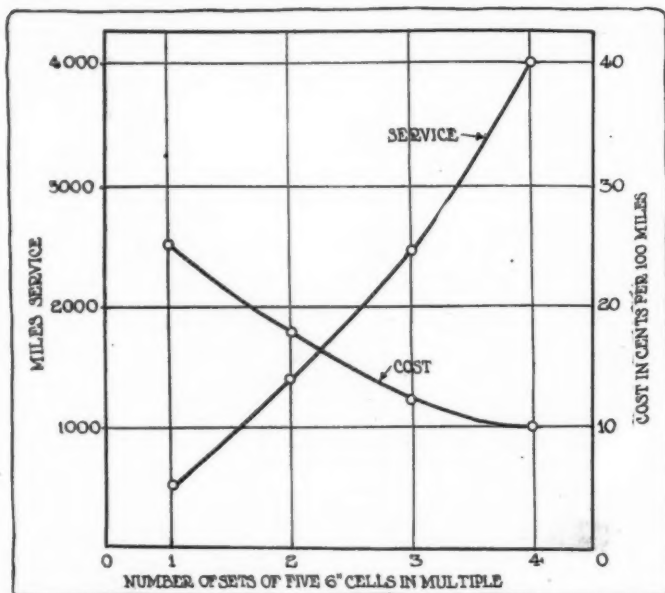


Fig. 1—Number of sets of cells in series—multiple is plotted on the baseline, while ordinates represent miles of service and cost in cents per 100 miles

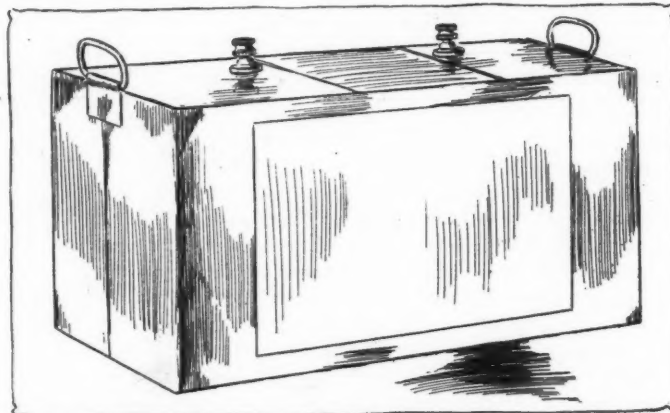


Fig. 2—Exterior view of the multiple battery, which is composed of a number of dry cells in a metallic case. The cells are permanently connected by soldered copper strips. The case is hermetically sealed



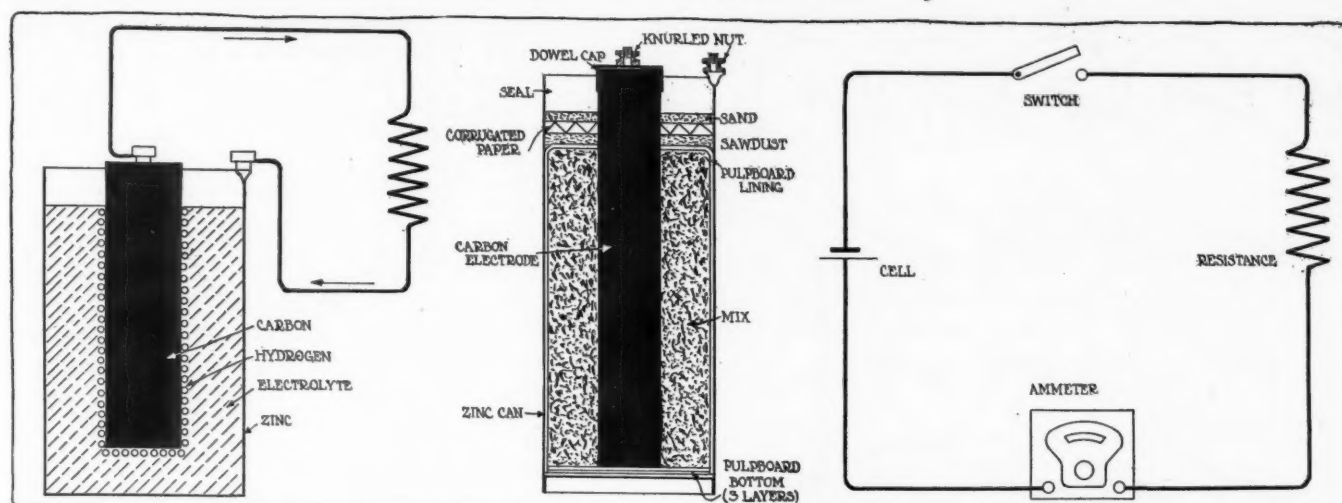


Fig. 3—Left—Diagrammatic sketch of a dry cell. Fig. 4—Center—Cross-sectional view of a commercial dry cell. Fig. 5—Right—Method of testing cells to obtain curves, Figs. 6 and 7

internal resistance of the cell and hinders the flow of current.

In addition a secondary electromotive force is set up between the hydrogen and the zinc which also tends to decrease the current. The current flowing in the external circuit is thus gradually cut down, and drops practically to zero if the circuit is closed long enough. This phenomenon is known as polarization.

#### Commercial Cell Must Be Depolarizer

It is evident that a dry cell of the type just described is of little practical value, since it becomes polarized as soon as it is required to furnish an appreciable current. A commercial dry cell must therefore contain a depolarizer, that is, a substance which prevents polarization. The depolarizer usually used is manganese dioxide, a chemical which can combine with the hydrogen, oxidizing it to water. The depolarizer is included in the mix of the dry cell.

In addition to the carbon the mix also contains powdered graphite to increase its conductivity. Fig. 4 is an accurate cross sectional view of a commercial dry cell. When a moderate current is drawn from a cell of this sort, the hydrogen liberated is largely taken care of by the depolarizer, and the current falls off but little. This is best shown by curves, Figs. 6 and 7. These curves were obtained from two cells, alike in every respect except that one contained depolarizer while the other did not. Each cell was connected in series with an ammeter through a low resistance as shown

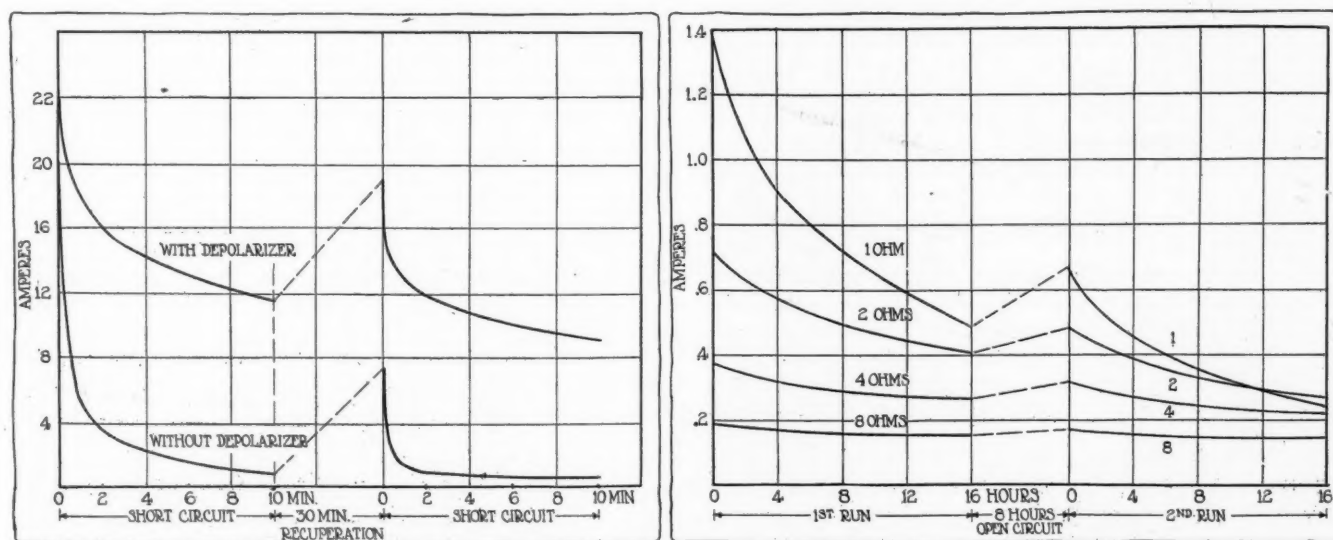
in Fig. 5, the circuit closed, and the current flowing noted at frequent intervals. The circuit was broken after running for 10 minutes. After standing on open circuit for 30 minutes, the cells were again subjected to the same test, with the results shown in the second half of the curves.

It will be noticed that the cell containing depolarizer returned to almost its original current value and gave a curve comparing favorably with the original curve, while the cell containing no depolarizer recovered but little and fell off again immediately when current was drawn. This ability of a dry cell to come back is called recuperative power. It is one of the features which makes the dry cell so valuable as a source of ignition current.

The curves, Fig. 7, are also very instructive. These curves represent current drop for dry cells short circuited for 16 hours through various amounts of resistance. The second half of the curves shows values obtained on repeating the test after allowing the cells to stand on open circuit for 8 hours. The facts brought out by these tests are:

#### Results of the Tests

1—The current drop is greater when the current drain is heavy than when it is light. Thus, on discharge through 1 ohm for 16 hours, the current drop is .85 ampere, or 63.5 per cent. of the original value, while the drop on discharge through 8 ohms for the same period is but .015 amperes, or 8.4 per cent. of the original value. It is therefore apparent



Figs. 6 and 7—Curves obtained from two cells which were identical except that one contained depolarizer and the other did not

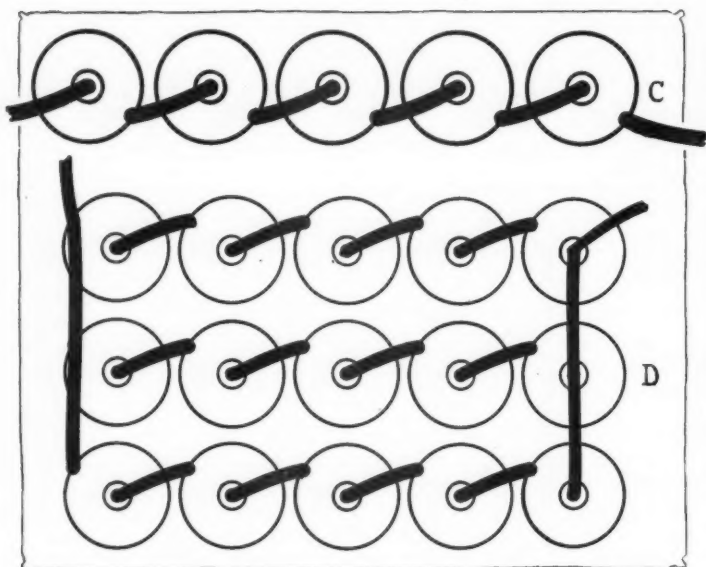


Fig. 8—C, five dry cells connected in series. Fig. 9—D, three sets of five cells in series connected in multiple

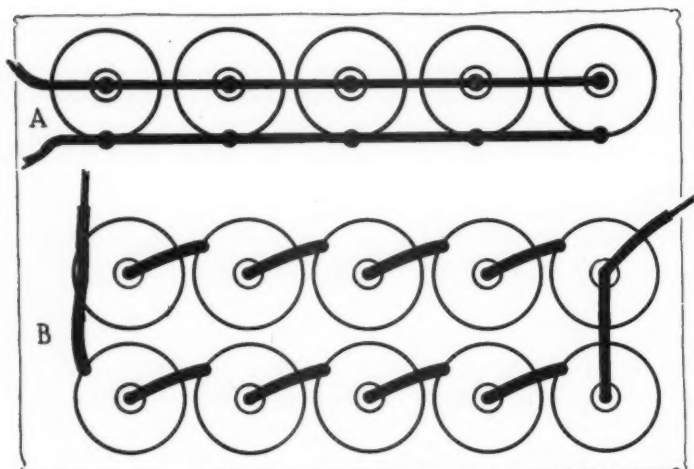


Fig. 10—A, five cells connected in multiple. Fig. 11—B, two sets of five cells in series connected in multiple

that if dry cells are used on ignition service, where they must be discarded when the current available drops below a definite minimum, they will last much longer if the current drain is light than if it is heavy. There is, however, a certain definite current drain (its exact value varies with other service conditions) at which the efficiency of the dry cell is a maximum. It does not pay to reduce the drain below this point, and efficiency suffers if it is much above this value. The regulation of current drain will be discussed later. For the present it will be sufficient to say that, within certain limits, the current drain may be controlled by varying the method of cell connection.

2—Recuperation after light current drains is more complete than after heavy drains. Thus the curves show that a dry cell after discharging through 8 ohms for 16 hours, and then standing on open circuit for 8 hours, will on again starting the test show 97 per cent. of its original current value, while a dry cell put through the same test with a 1 ohm resistance will only show about 50 per cent. of its original value. This again shows the desirability of light current drains.

Other factors influencing the efficiency of dry cells are the duration and frequency of service. The more frequent the use and the longer the service time, the lighter the current drain must be if economical operation is desired.

It is now apparent that the amount of service obtainable

from dry cells is largely dependent on the nature of the service conditions. Our problem is to determine what conditions are most efficient. The data considered indicate that a light current drain is conducive to efficiency. The following table shows about what service may be expected from a set of five 6-inch dry cells with different ignition systems when used on an automobile which is driven 2 hours a day.

	Miles.
1. Multiple unit vibrator coil requiring 1 ampere.....	300
2. Multiple unit vibrator coil requiring $\frac{1}{2}$ ampere.....	800
3. Multiple unit vibrator coil requiring $\frac{1}{4}$ ampere.....	1,900
4. Single spark system requiring $\frac{1}{4}$ ampere.....	1,900
5. Single spark system requiring $\frac{1}{2}$ ampere.....	2,500
6. Single spark system requiring $\frac{1}{5}$ ampere.....	3,300

No. 1 in this table is not at all unusual. Such conditions are the kind which cause prejudice against the use of dry cells.

No. 2 represents about average conditions with the multiple-unit coil.

No. 3 is possible in some cases, but it requires constant attention to keep a four-unit coil working on so small a drain.

No. 5 represents average service with a single spark.

No. 6 shows what can be done under good conditions.

These figures represent the service obtainable when the car is driven 2 hours a day. For low drains the duration of service is not important and about the same mileage can be expected even if the machine is driven for much more than 2 hours a day. As the drain increases, however, this factor becomes of greater relative importance, and in the case of the heaviest drain, 4 to 6 hours of continuous use per day would reduce the service considerably.

#### The Multiple Battery

We all know that connecting dry cells in series increases the voltage but not the capacity or the available ampere-hours of service. Most ignition systems are designed to operate with about five cells in series. Fig. 8 shows a set so connected. From it up to 25 ampere hours of service per cell can be obtained. Fewer cells in series would not operate the system, while more cells in series would not lengthen the life of the set. The voltage of a set of cells connected in series, as is well known, is equal to the sum of the voltages of the individual cells. The voltage of a set of five cells connected in multiple, Fig. 10, however, is the same as to the voltage of a single cell, but each cell is required to furnish but one-fifth of the current.

These two methods of connection may be combined. If, for instance, we connect two series sets of five in multiple, Fig. 11, the voltage is the same as before. When such a set is used with an ignition system, the current drain from the whole battery is practically the same as it would be from a single set. Therefore the drain on each of the sets in multiple is approximately one-half of that on the single set in the first case considered.

It has already been shown that a reduction in drain means an increase in battery efficiency. This decrease in current drain is best obtained by the series-multiple connection just described, hence its economy is apparent. The accompanying curve is based on figures obtained by actual experiment, and shows the economy of series-multiple connections in a striking manner. The tests were made upon a four-cycle, four-cylinder automobile engine running at 20 miles per hour. The engine was equipped with a standard commercial vibrating coil adjusted to draw a moderate current. No. 6 Columbia dry cells were used, connected in series-multiple, as shown in the curves and table. After installation of the batteries the engine was run continuously day and night until it started missing.

In the curves, Fig. 1, the number of sets of cells in series-multiple is plotted on the base-line and the ordinates represent miles service and cost in cents per 100 miles. The decrease in cost with increasing numbers of sets in series-multiple is especially striking.—F. A. STRAUSS, National Carbon Co.



# Pedestrian Traffic Control in Large Cities

Chiefs of Police of Big Municipalities Throughout United States Believe that the Man Afoot Must Obey Signals of the Traffic Officer and Follow the Stream Lines

By J. Edward Schipper

**N**INETY per cent. of the accidents on city streets occur at the crossings and a large share of the remaining 10 per cent. are due to the fact that unheeding pedestrians cross the streets at unexpected points between street intersections.

In every city of importance in the United States the chief of police believes it necessary to regulate pedestrian traffic almost as strictly as the vehicular. In the congested centers and metropolitan districts of these large cities the pedestrian is in most cases only afforded legal protection when crossing at the intersection. In others the driver of a vehicle is responsible for the care of the pedestrian whether it be in the center of the street or at the corner. The general view taken is that while the street and roadways are primarily intended for vehicles and animals, the pedestrian is entitled to the right to cross them at any reasonable time and in a reasonable manner and that the operator of the vehicle is bound to respect this right.

## Flow Must Not Be Interrupted

In congested centers it has long been recognized as a necessity that the traffic should flow across the street intersections continuously in one direction at a time. For this object traffic police are assigned to these corners to regulate the flow. It is only recently that the necessity of controlling the pedestrian as well as the vehicle has been recognized and the elimination of the pedestrian who dodges between vehicles passing across his path in a steady stream has just commenced. The result of this recognized problem in traffic regulation has resulted in the incorporation into city ordinances of sections dealing directly with the government of the motion of the pedestrian which restricts his action as completely as it does the vehicle.

These regulations are enforced by the traffic police and people violating them are as much liable to a fine if they are on foot as if they were driving a motor car or horse. Take for instance the city ordinance of Indianapolis which deals with traffic. In this it states that: "Pedestrians in the congested districts shall cross intersections at the same time as vehicles going in their direction and shall observe the signals regulating the same. Pedestrians must not unnecessarily use the roadway and in waiting for street cars must remain upon the sidewalk until such cars approach." Failure to observe this regulation calls for a fine of not more than \$100 to which may be added 30 days in jail at hard labor.

The Indianapolis regulation seems somewhat severe perhaps to many but the result has been that this power in the hands of the police acts as a strong incentive towards careful street crossing.

## Streets Intended for Vehicles

The generally accepted view that the streets are intended for the vehicles is illustrated by the rules for the regulation of street traffic issued by the police department of Chicago.

In these it states pedestrians should remember that, while they have the right to cross the streets in safety, the streets are primarily intended for vehicles and they should therefore conform to all the traffic rules in order to contribute not only to their own safety but to facilitate the movement of traffic. Pedestrians are required to cross the streets only at regular crossings and then at right angles. They are also required to wait for the signal of traffic policemen wherever one is stationed and to move in the direction of traffic only. The same provision is made in the traffic ordinances of many other cities, but in others the requirement is included in the ordinance in the form of a request.

An illustration of this is given in the traffic regulations of Portland, Ore., which state that, "Pedestrians are requested to conform to all of the traffic rules herein provided, for their safety, and refrain from crossing streets except at regular crossings and at right angles." This section, however, goes on to state that they shall in all cases wait for the signal of the traffic officer wherever one is stationed and move at his signal only.

## Streets Crossed at Right Angles

Where pedestrians are especially provided for in the traffic regulations the laws are almost unanimous in requiring the crossing of the street at right angles. Cutting diagonally across corners is even more expressly forbidden than the crossing of the street between corners.

In the city of South Bend, Ind., the law provides that

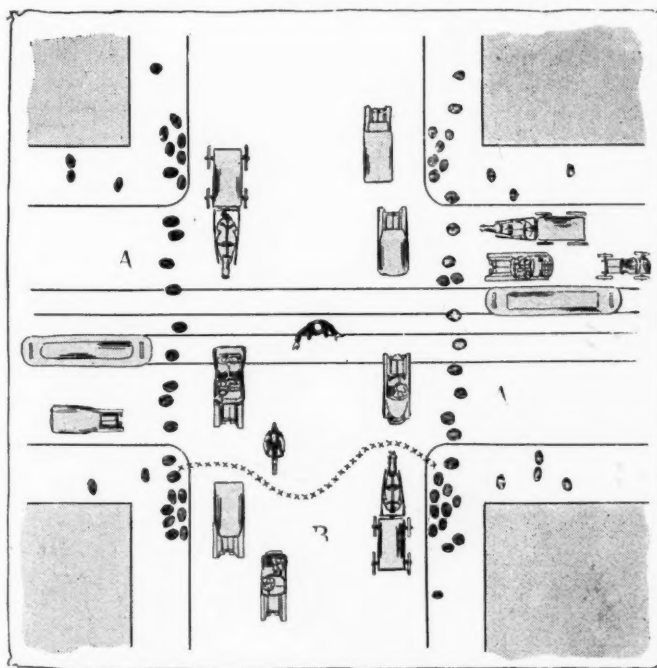


Fig. 1—A—Correct course of a pedestrian across the intersection of two streets in a congested district. B—Incorrect

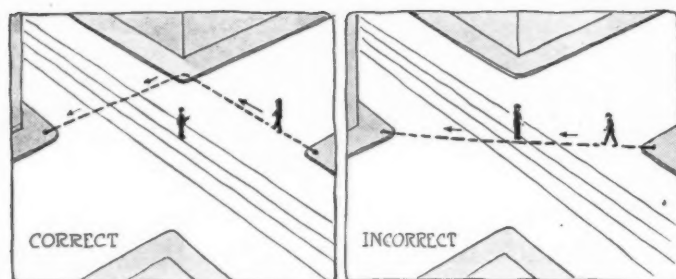


Fig. 2—Two methods of crossing a street intersection through the stream of traffic

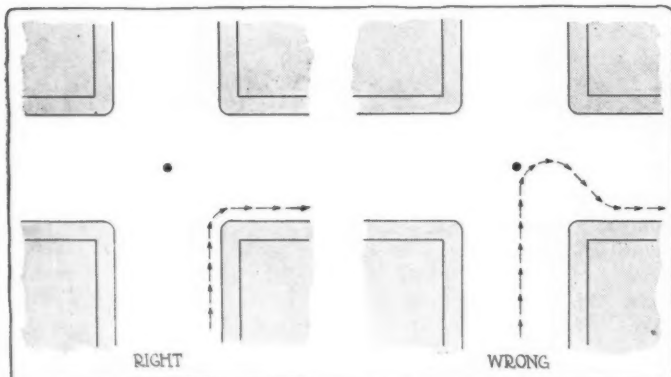


Fig. 3—Correct and incorrect methods of rounding a corner to the right

pedestrians must use the sidewalks. It states that, "Except in case of emergency pedestrians should use only the sidewalks and crosswalks. The roadbeds of highways and streets are primarily intended for vehicles, but pedestrians have the right to cross them in safety, and all drivers of vehicles shall exercise all proper care not to injure pedestrians, and pedestrians before stepping from the sidewalk to the roadbed should look to see what is approaching, and should not needlessly interfere with the passage of vehicles."

In other words, before the pedestrian leaves the curb the vehicle has the right of way, since the pedestrian must not needlessly interfere with its passage. After the pedestrian leaves the curb, however, the drivers of passing vehicles must not submit him to any danger.

In Cincinnati, O., the articles of the law dealing with pedestrians are sharply and clearly drawn. They compel people on foot to obey the traffic officers to the same extent as vehicles are required. One section states that: "every driver and all pedestrians shall stop immediately upon the signal by voice, hand or otherwise of any member of the police force." And another requires: "Pedestrians when crossing streets in the congested district shall move in the direction of traffic and shall wait for signal from traffic po-

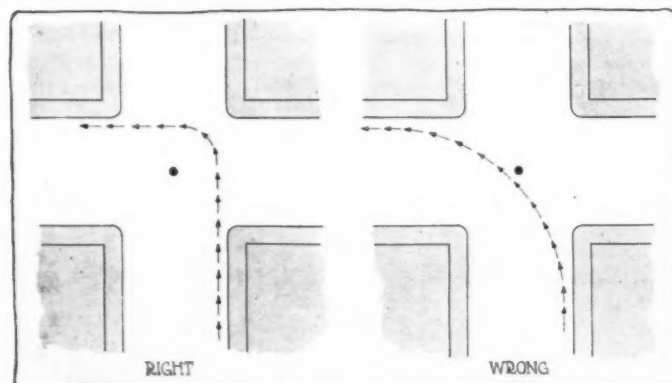


Fig. 4—Turning into a street to the left. Correct and incorrect methods

licemen wherever one is stationed. Persons crossing any street at the intersection thereof with another street within the congested district shall pass over such part of the street as is included within the line of the sidewalk projected crossing, and not diagonally." A penalty is provided for violation of this section of not more than \$25 and the costs of prosecution.

The regulations for street traffic in the city of Boston require the same care and conduct on the part of the pedestrian at the street corners as those of Cincinnati just cited.

#### Pedestrian Has Right-of-Way

The rules of the road as issued by the City Council of the city of Des Moines, Ia., distinctly give the pedestrian the right-of-way over the crossings at street intersections. This same law requires the driver of a motor vehicle to slow down at each street intersection and should there be pedestrians crossing they have the first right to the use of the road at this point. In the District of Columbia the right-of-way is given to pedestrians at street crossings only and in this respect the laws of these two communities are exactly similar.

From the foregoing examples of law in large cities it is evident that they are in exact uniformity as to the conduct of the pedestrian in his use of that part of the street between the two sidewalks. A pedestrian in a strange city will be adhering to the spirit of the law if he will observe the following:

- 1—Only cross the street at the corner and then at right angles and not diagonally as illustrated in Fig. 2.
- 2—Cross the street only when the vehicular traffic is going in the same direction.
- 3—Do not cross through the traffic stream at points where traffic officers are stationed.

#### Driving Regulations Uniform

The regulations governing the management of an automobile in a large city are practically the same all over the country. In ordinary running it is required that vehicles should keep to the right, except when passing other vehicles, at which time they should pass to the left. Where the trolley tracks are in the center of the road this is distinctly not the case, however, as in passing to the left of a trolley it is necessary to go to the left side of the road and thus distinctly violate the law. When a car has stopped to admit a group of passengers it is necessary to stop also to permit these people to board the car. It is against the law in nearly every city to cut around to the left of the standing car.

It is at the street intersections that the greatest care and judgment must be used and it is naturally about this point that most of the regulations dealing with traffic are directed. In approaching a street intersection when it is desired to go straight through and when not traveling in a congested part of the city it is only necessary to slow down sufficiently to have the car under control before passing right through. Where there is a car, however, coming through the side street it is generally the case that the car moving in a north and south direction has the right of way over one traveling east and west. The latter, therefore, must slow down sufficiently to allow the car traveling in the north and south direction to cross.

In the congested district of a large city there is a traffic policeman generally stationed at the crossing. In approaching a corner of this type it is necessary to come practically to a stop or at least to slow down until the signal is given to cross by the officer or it can be perceived that the stream of traffic is going in the direction in which the approaching vehicle desires to cross. Where the traffic stream is in the other direction it is necessary to stop the car before the front wheels project over the line of crossing of the near curb.

In turning a corner to the right the vehicle must keep as close to the curb as possible. This necessitates slowing down



to a great degree in order that the car will not swing out toward the left side of the road into which it is entering. This condition is illustrated in Fig. 3.

In turning to the left into another street it is generally required that the vehicle shall pass to the right of and beyond the center of the street intersecting before turning. Where a traffic policeman is on duty he generally stands at the center of intersection of the two streets, which is the key position of traffic coming in either direction. When the policeman is in this position it is only necessary to drive around him in the same manner as a yacht rounding a buoy in turning an angle of the course. Where the policeman is not on duty it is easy to judge the center of intersection of the two streets and to make a wide detour around this point.

When bringing the car to a halt on the right side of the street going in the direction of travel it is only necessary to swing to the right as close to the curb as possible and remain stationary at this point. When it is desired to bring up on the left side of the street the car cannot be driven directly across and stand facing in the direction of original travel, but will have to be swung around in an arc and brought up so that its right side will be nearest the curb. The correct and incorrect methods of making this turn are shown in Fig. 5.

Before slowing down to make a turn the driver should

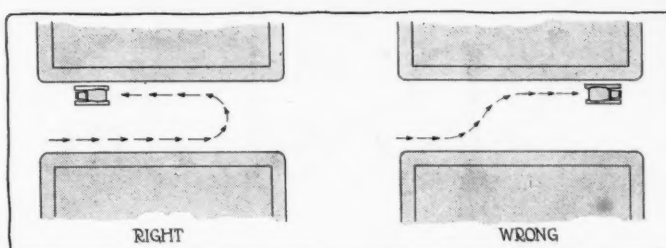


Fig. 5—Correct and incorrect methods of bringing up to a curb on the opposite side of a street

indicate to vehicles following his intention by raising his right hand in such a manner that it will be easily perceived by the following driver. In New York City a definite code of signals is used as follows:

Right hand extended means turning out to the right. Left hand extended means turning out to the left. Hand extended high with palm forward means going ahead. Hand extended high with palm backward means stop.

Certain vehicles have right-of-way and the order of precedence is generally as follows: Police, fire department, emergency repair wagons, U. S. mail vehicles and ambulances.

## Parallel Tracks for Horses and Automobiles On Champs-Élysées

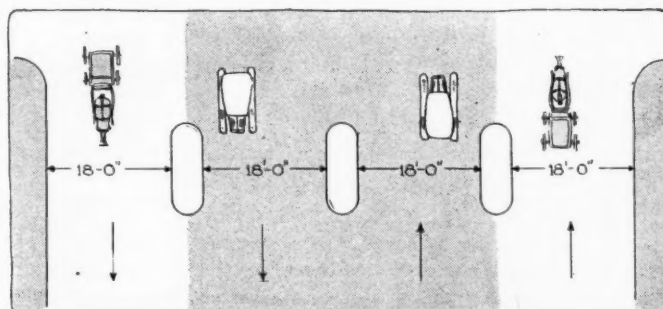
*Famous Parisian Avenue Remodeled for Automobile Traffic*

PARIS, April 16—Avenue des Champs-Élysées, Paris, the first city highway to be divided into parallel tracks for horses and motor traffic, was rearranged last winter in view of the continued increase in the number of automobiles. Between 6 and 7 years ago the police authorities decided to divide this aristocratic avenue into three tracks of equal width, the central one to be used exclusively by up and down streams of automobiles, and the two outside tracks for respectively up and down horse traffic. The innovation was successful from every standpoint. Of late years it has been recognized that the amount of space given to automobile traffic was inadequate. Thus a considerable portion of the avenue has now been divided into four tracks, and the remainder will be converted as soon as possible. Under this arrangement the outer tracks, next to the sidewalk, are for up and down streams of horse-drawn vehicles, bicycles, pushcarts, etc. The two middle tracks are for up and down streams of automobiles. The division is marked by three refuges, or islands, placed at intervals. Distance between the islands is 18 feet, measuring from sidewalk to No. 1 island, No. 1 island to central refuge, central refuge to No. 3 island, and No. 3 island to sidewalk. Horses and automobiles have thus the right to 36 feet of highway each, but the automobile section being in the center is more valuable than that for horse traffic, there always being a certain zone close to the sidewalk which is very rarely used.

### Traffic Is Tremendous

The Champs-Élysées probably carries more traffic than any highway in the world. A recent census taken from 10.30 to 11.30 a. m. showed that 356 horse vehicles passed a given point in the avenue and that the number of automobiles was 1,192. When this census was taken the amount of traffic was normal. The time was most favorable to horse vehicles, for it is during the morning from 10 to 12, that practically all the goods deliveries take place, and almost all this work is done by horses. The 356 horse vehicles comprised 2 private carriages, 186 horse cabs, and 169 delivery vans (groceries, laundry, express, etc.). The automobiles consisted of 46 delivery vans, 15 motor buses, 231 taxicabs, and 900 pri-

vate cars. During the height of the spring and autumn seasons the number of automobiles passing a given point in the Champs-Élysées is not less than 5000 an hour at certain times of the day. The average number of motor vehicles passing within 24 hours during the month of November is between 9,000 and 10,000.



Plan view of the Champs-Élysées as re-arranged with parallel tracks



The Champs-Élysées, Paris, at a quiet time of day

# The Rostrum

## Carbureter Adjustments Too Difficult

**E**DITOR THE AUTOMOBILE:—The lead letter in last week's Rostrum, entitled, Many Small Details of Car Design Can Be Improved, should bring forth some good ideas. It seems to me that in many cases the owner rather than the manufacturer is best qualified to say where a car design can be bettered.

While every maker tests out new models, more or less thoroughly, it is impossible for these tests to be absolutely exhaustive; to bring out every small defect a car may possess. It is the man that drives the car, day in and day out, for a long period, that becomes familiar with all its weaknesses.

In this connection, there is one important feature that I do not believe has received the attention it should and that is proper carbureter adjustment. There is not *one car in ten*, in the hands of the average owner that has this instrument so set that it will give best results over all ranges of speed. I have found that the ordinary medium-priced or cheap car is delivered to the purchaser without the carbureter adjusted so that it will perform to the best of its ability. This is due to carelessness on the part of both manufacturer and dealer.

The new owner receives his car, tests it out and finds that it is not as lively as it should be. Possibly he takes it back

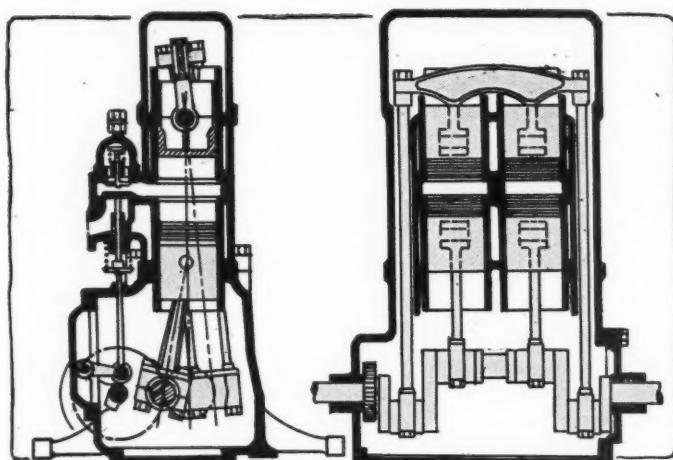


Fig. 1—Gobron-Brillé double-piston motor

to the dealer. If so, the latter may take the time and trouble to adjust the carbureter, but to make a good adjustment takes time and patience, and more than likely the dealer is too busy to bother and sends the owner away with the carbureter unimproved.

Then the owner tries adjusting it himself or calls some of his friends in to aid him, with results that are more often unsuccessful than not.

The difficulty is with the carbureter design, most carbureters are complicated, having many adjustments and it is impossible for the average man to obtain best performance unless by accident. Proper adjustment is even difficult for the average dealer or mechanic.

Therefore, I think it is safe to conclude that it would be better to sacrifice slightly bettered economy and power, for the better average performance that a simpler carbureter would give in the hands of the average owner.

Philadelphia, Pa.

K. H. K.

## Putting the Car Into Service

Editor THE AUTOMOBILE:—Will you please tell me the things that should be done to put my car into commission for the season after being laid up all winter?

Binghamton, N. Y.

ROBERT M. ABBOTT.

—In conditioning a car for the summer, the method of procedure depends entirely on whether the car received an overhauling during the winter and whether the car is very much in need of repair.

If the car has been overhauled, first give the car a thorough cleaning. Wash the body with soft soap and luke-warm water, until all grease and mud has been removed, rinse the soap off with fresh water and dry the body with chamois. Treat the running gear in similar fashion. Brush the top off thoroughly and wash with luke-warm water and castile soap.

If the car's overhauling has been thorough, about all that remains is to put oil in the motor, water in the radiator, fill the grease cups and oil holes and to be on the safe side it is well to see that all other parts are properly lubricated.

On account of the durability of the modern car, the practice of giving it a yearly overhauling is not as general as it once was. Many cars are now capable of running 2 or 3 years or more without a complete going over.

In order to avoid small delays on the road due to insignificant troubles and so that one has a correct idea of the condition of every part of the mechanism it is well to inspect the car thoroughly before it begins another year.

Test the compression of the motor by opening all the

priming cups except the one on the cylinder under inspection, and then turn the motor over slowly to see if the cylinder holds its charge.

The cylinders that are weak should have their exhaust valves ground and push-rods adjusted, and if this does not improve compression, look for gummed or broken piston rings, worn pistons or cylinders.

If the cylinders are carbonized to any extent, have them burned out by the oxygen process.

Inspect the bearings and if any are loose remove shims from underneath the caps or file down the caps, so that they may be drawn up tight on the crankshaft.

Finally drain all the oil from the motor and flush the motor and especially the lubricating system with kerosene, to remove all the gummed oil, and dirt. Then fill the reservoir with fresh oil.

The ignition system should receive attention next. See that the breaker points meet squarely and that the gap between them when they separate is somewhere between 1-32 and 1-64 inch. If they are worn down they should be dressed with a fine file. Replace any carbon brushes that are worn.

Inspect the wiring for defective insulation and tighten all connections.

Remove the spark plugs, clean them of soot and look for cracked porcelains. Adjust the spark gaps to 1-32 inch.

The treatment of the clutch depends on the type used. The leather of a cone clutch should be softened with an application of neatsfoot oil, while a disk clutch should be



cleaned with kerosene to remove dirt and gummed oil.

Adjust the fan belt; tighten the pump packing glands. Drain the carburetor and clean the strainer, if there is one.

Fill the gearcase three-quarters full of grease and try to shake the shafts. If any play is noted, adjust the bearings if an adjustment is provided. Replace badly worn gears.

Fill the universals with a heavy grease and put a liberal quantity of medium grease in the rear axle. Note the amount of play between the bevel gears. If it is very noticeable it should be removed by screwing up on the collar back of the bevel pinion. This is a job for the repair man.

Remove the hub caps from the front wheels, and tighten the bearings if they need it. Fill the hub caps with a medium grease and screw them back on.

Pack the steering gear housing with grease and if there is any lost motion in the mechanism, adjust it. As a rule, there is an adjustment at the top of the housing.

Play in the ball joints of the drag link can be removed by screwing up on the nuts that hold the sockets in place.

Grease or oil the motor and generator bearings.

The motor and generator of the starting and lighting system should next receive attention. Oil or grease the bearings of these two machines and inspect the carbon brushes, if any are badly worn, they should be replaced.

Bring the specific gravity of the liquid in the storage battery up to normal, it should be between 12.75 and 13.00 Beaumé. This is done by means of an ordinary hydrometer, purchasable at any supply store. If the liquid is below gravity, add sulphuric acid, if above, distilled water.

Adjust the brakes, and reline them if necessary.

Finally fill all grease cups, oil all the pin joints and the car is ready to run.

### Advance of Sparks Causes Miss

Editor THE AUTOMOBILE:—I have a 1914 touring car. The motor runs smooth when the spark is as high as it will go and also when it is one-fourth up, but between these two points, it misses. Kindly let me know what the trouble is.

Mt. Vernon, Mo.

J. M. M.

—This is a very rare trouble and is caused, it is said, by the breaker points being too far apart or to their sticking. The gap between the points should not be over 1-32-inch, nor less than 1-64. See that the breaker parts work freely

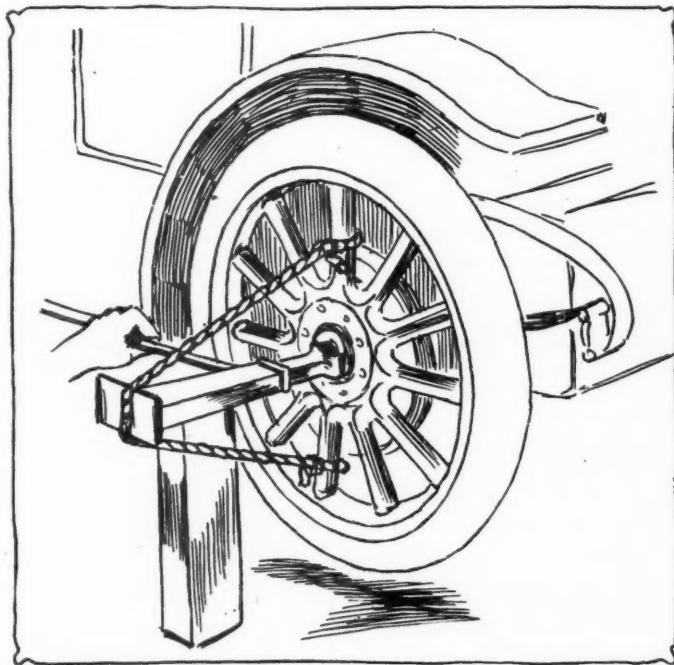


Fig. 3—Reader's suggestion for using jack as wheel puller

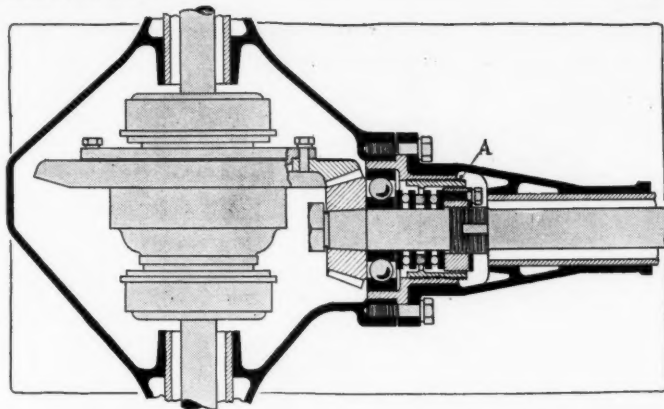


Fig. 2—Chalmers model K rear axle. Pinion adjustment at A

and are properly lubricated. Those who have experienced this trouble are unable, however, to advance any theories as to why the missing of the motor will occur when the spark lever is in certain positions but will run smoothly at other points.

### Gobron-Brillé Double-Piston Motor

Editor THE AUTOMOBILE:—1—Is there a car manufactured, propelled by an engine with an explosive chamber at both ends of the cylinder?

2—I am under the impression that I saw one at the show at Madison Square Garden about 1906 and the name of the car was, as near as I can remember, Gobron-Brian.

I would like to secure a circular or description of this engine if possible.

New York, N. Y.

COLTON REED.

—1—There is no motor manufactured, with a combustion chamber at both ends of the cylinder. Such a motor is commonly known as a double acting engine, and although this construction is common in large gas engine practice, it has never been brought into use for automobiles. As fully explained in the March 12 issue of THE AUTOMOBILE, the double-acting motor requires a water-cooled piston which is objectionable on account of its complication. Furthermore, the piston rod must have a packing gland and it is difficult to keep this tight, especially on a small engine.

2—The Gobron-Brillé is a French machine that has been made for many years. It has a double-piston motor, there being two pistons in each cylinder. It is not, however, a double-acting motor in the ordinary sense of the word because there is only one combustion chamber per pair of pistons while with the double-acting motor there are generally two combustion chambers and one piston.

In the Gobron-Brillé motor, Fig. 1, the two pistons move in opposite directions. The lower one being attached to the crankshaft in the ordinary manner while the upper one is attached by the double connecting-rod, as indicated. This construction calls for two crank-pin bearings instead of one, as is usual, for each piston.

The object of using the double-piston construction is to reduce vibration. The force due to the reciprocating movement of the lower piston being neutralized by that of the upper one.

### Adjusting Pinion on Rear Axle

Editor THE AUTOMOBILE:—Will you please explain how to adjust the driving pinion on the Chalmers 30, model K? Could the wear be taken up by the insertion of a washer back of the driving pinion?

Mount Vernon, N. Y.

J. S. K.

It is not advisable to use a washer in order to bring the pinion into adjustment. The pinion can be easily adjusted by screwing up on the adjusting sleeve shown at A, Fig. 2.

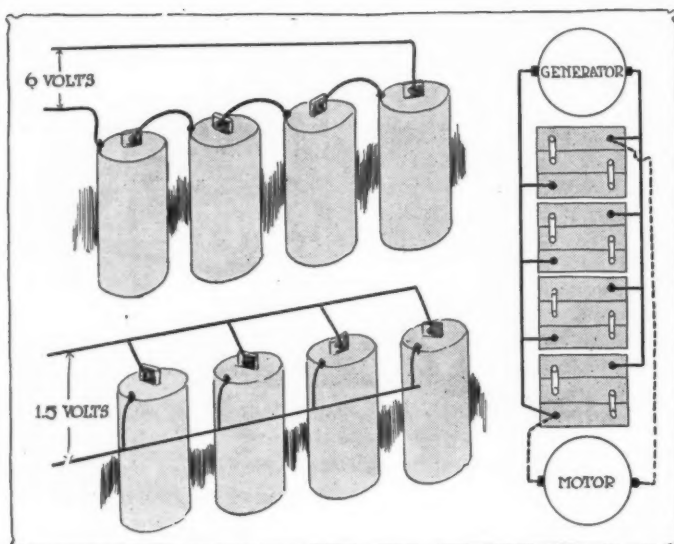


Fig. 4—Left—Upper, batteries connected in series; lower, in parallel. Fig. 5—Right—Diagram showing wiring for starting and lighting system in which the generator operates at 6 volts and the motor at 24. Each cell gives 6 volts. The generator is in parallel and the motor in series

This sleeve is slotted and is held in position by a cap screw. Remove this screw, bring the pinion into proper mesh and then lock the sleeve in position. Care must be taken not to bring the gears too near together.

### Using Jack as Wheel Puller

Editor THE AUTOMOBILE:—I recently had quite a time getting a badly stuck wheel off my car, and as a last resort I tried a new plan which did the work in a few minutes. It may be an old thing to some people, but at that, it might come in handy to someone.

First jack up the car so the weight is off the wheel, Fig. 3, and remove the nut from the spindle. Then put the top end of the jack against the end of the spindle and a block of wood under the jack to hold it up. Tie a piece of heavy rope around the spokes and the jack. Then work the jack same as in raising the car.

Metz, W. Va.

L. C. SHIELDS.

### Batteries in Series and Parallel

Editor THE AUTOMOBILE:—1—Can you take off the fan belt in winter without the motor becoming as warm as it would in summer?

2—Please show by diagram or other means a set of four dry cells connected in parallel and in series. Note which increases voltage and which amperage.

3—Please show the ordinary starter and lighting battery and explain how you get 6 volts for lights and 24 volts for starting.

4—What is the setting for breaker or platinum points on the average magneto?

5—Is it not a fact that a motor will knock quicker with a weak mixture than it will with a rich mixture?

Inman, S. C.

C. G. F.

—1—Whether the motor will cool properly in winter with the fan belt removed depends to a large extent on the capacity of the cooling system and on the character of the weather. In a variable climate where it is cold one day and warm the next, the motor would probably become too hot when the weather turned warm. In the South it would be inadvisable to run without the belt while in the North it would be all right to do so.

2—Four dry cells connected in series and in parallel are

shown in the diagram, Fig. 4. When cells are connected in series, their voltages are added together, therefore assuming that a single cell gives a voltage of 1.5 then four in series will give four times this amount, or 6. On the other hand it would hardly be correct to say that the four cells in parallel will give four times the amperage, of a single cell. Amperage is the rate of current flow, and depends directly on the voltage and inversely on the resistance. Under a given set of conditions, that is, with a certain resistance in circuit, one cell giving 1.5 volts will furnish as great an amperage, for the instant, as four cells or any number of cells arranged in parallel. But with only one cell the voltage will drop much sooner than when four are used and if an infinite number were placed in parallel the voltage would never drop.

However the useful life of four cells in parallel is over four times the life of a single cell, in other words the watt-hour capacity is more than four times as much.

Batteries connected in parallel and series have an hydraulic analogy that will present this question to you very clearly. Suppose that we had 4 gallons of water contained in a cylindrical tank 1 foot high. If a hole 1 inch in diameter is drilled in the bottom, the water will flow out at a certain rate, quickly at the start and decreasing in speed, until all the water is gone. Now, if we have another tank, the same height, containing just 1 gallon of water when it is full, the water will start flowing at the same rate but the tank will become exhausted in one-fourth the time.

3—Fig. 5 shows the connections in order to give 24 volts for starting and 6 volts for lighting. Four 6-volt batteries are used. The generator is connected in parallel with them while the motor is in series, therefore in the latter case the voltages of the four are added. Since each battery supplies 6 volts the voltage supplied to the starting motor is 24 but since they are connected in parallel for lighting, the voltage is only 6.

4—The gap between the breaker points of the magneto varies between 1-32 and 1-64 inches, depending on the make of magneto. The proper distance can easily be determined by experiment, if the points are too near, the motor will miss at high speeds, while if too far apart, it will miss at slow speeds or possibly not run at all.

5—A weak mixture is more likely to cause knocking.

### Ignition System on Chalmers Six

Editor THE AUTOMOBILE:—Will you please publish in the Rostrum a detailed description of the ignition system used on the Chalmers light six 48?

Grottoes, Va.

R. O. CANADA.

—The Atwater Kent Unisparker is used on this car. In principle this device is very much like a low-tension magneto with the one difference that the current is supplied by a battery instead of by a magneto armature.

In place of the magneto breaker, there is a contact maker and this is a unit with the distributor, the two being contained in the same casing. The contact maker and distributor brush are driven by a single shaft which is driven from the engine at one and one-half crankshaft speed. In addition there is a single non-vibrating coil with condenser. The arrangement of these parts is indicated in Fig. 7.

The principle of the system is well shown in Fig. 6. The primary circuit is indicated by the heavy lines and the secondary by the light. Contact is first formed by the contact maker at A, and when it is broken a current is induced in the secondary at B, the latter representing the spark gap of the plug.

In the wiring diagram, Fig. 7, the low-tension current is supplied by either the storage battery or the generator.

The ignition feed wires running from the generator and storage battery to the low-tension winding of the coil, are shown at A, Fig. 7. The current passes through this wind-



ing and out to the contact maker. The direction of the current is indicated by arrows.

The high-tension current induced by the breaking of the low-tension circuit is distributed by a rotating brush on the distributor to metal segments imbedded in the distributor casing. These segments connect with the secondary wires to the spark plugs. From the plugs, the current flows through the motor and frame back to the coil through the ground wire G.

The operation of the contact maker is shown in Fig. 8. At the left, the cam A is shown before the arm B is raised, raising the arm C so that it makes contact with the point D. The right view shows the arms B and C partly raised by the further rotation of the cam A, while the lower shows the contact made; in this position the arm has overridden the notch on the cam. After the lifter or pawl B has been pulled forward as far as its shaft will carry it, it is released, and is pulled back to its normal position by the spring. In returning it rides up over the notched shaft and the end of the lifter B bears for a brief instant against the projecting lip E, throwing the arm C into contact with point D. As the lifter instantly returns to its normal position, the contact arm is pulled back by the contact arm spring F and the contact is broken so quickly that the eye cannot follow the various movements.

### Special Lighting Outfit Preferable for Ford

Editor THE AUTOMOBILE:—I have just bought a Ford run-about and desire to know about using electric lights on it in this way. To put a Bosch or Splittorf magneto on it for ignition and then use the Ford magneto with a rectifier and storage battery for lighting. The point I especially want to know is, does the Ford magneto with a rectifier and storage battery give good service without constant attention, adjustment and repairs? Does the rectifier stay in good working condition without constant adjustment?

Broken Arrow, Okla.

J. L. LAWS.

—As far as we know there is no concern making a rectifier for the Ford magneto, and even if there were such a device, it would not be advisable to use the Ford magneto for lighting and to fit an extra machine for ignition.

Why not leave the ignition system the way it is and fit one of the many electric lighting outfits made especially for the Ford car? The cost would be no greater than would the adoption of the idea you have in mind.

### Hydrogen Peroxide Will Not Remove Carbon

Editor THE AUTOMOBILE:—Is peroxide of hydrogen successfully used in removing carbon deposit from the cylinders? If so, how should it be applied?

Roxbury, N. Y.

W. L. G.

Peroxide of hydrogen is not suitable for this purpose, as it has no action whatever on carbon. Hydrogen peroxide is

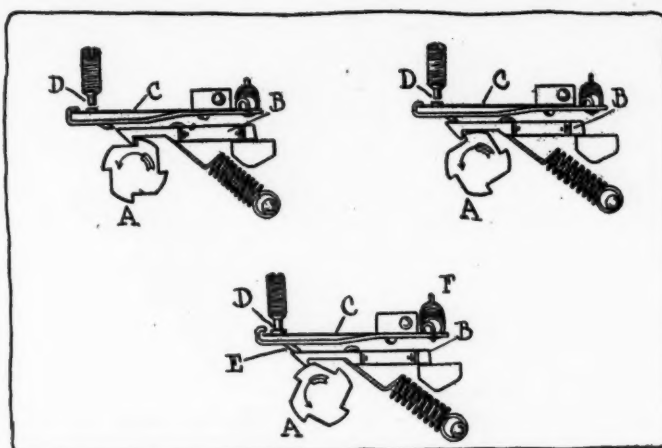


Fig. 8—Action of contact maker in producing a spark

a colorless liquid resembling water, although it is somewhat heavier.

Possibly you are thinking of the use of oxygen. This gas has been used for removing carbon from cylinders and has been found very effective. The cylinders are filled with oxygen and the carbon is set on fire by means of a taper or a piece of waste, the oxygen supporting the combustion so readily that the carbon is very quickly consumed, although it will not burn at all when air alone is present in the cylinder.

### Two-Cycle Motor Less Efficient

Editor THE AUTOMOBILE:—1—What are the chief troubles with the two-cycle motor in regards to its use in an automobile?

2—Would a two-cycle motor which received a fresh, compressed charge of gas in the head of the cylinder, thus driving out the exhaust gas through ports in the bottom be of any advantage?

I have an idea of such a motor, but am not sure whether it would be any good or not.

West Roxbury, Mass.

WINGATE ROLLINS.

—1—The arguments that are generally advanced against the two-cycle motor are that it is less efficient and not as flexible as the four-cycle type.

Less efficient because a certain amount of the incoming charge is forced out of the exhaust port and because the energy used in compressing the charge, preliminary to its transfer to the combustion chamber, is a complete loss. Lowered efficiency, of course, means poor fuel economy.

It is not as flexible as the four-cycle motor in that it will not run as slowly and furthermore it will not run smoothly at low speeds when the throttle is closed, but will skip almost every other explosion. The reason for this being that the percentage of combustible charge compared with the amount of exhaust gas in the cylinder is very small and the tendency is for the combustible gas to become mixed with the exhaust gas when the former is introduced, even though there is a baffle on the piston for the purpose of keeping the incoming charge intact. The result is that at low speeds and small throttle openings the motor runs very unevenly.

2—Without knowing more details concerning your motor it is impossible to give an opinion on it. The ordinary three-port, two-cycle motor has all the features of the motor you have described.

### Reader's Full Address Wanted

The Editor of the Rostrum is holding a letter for Mr. Oscar Martin, Cleveland, O. This letter is in answer to a letter from Mr. Martin that appeared in THE AUTOMOBILE for March 5.

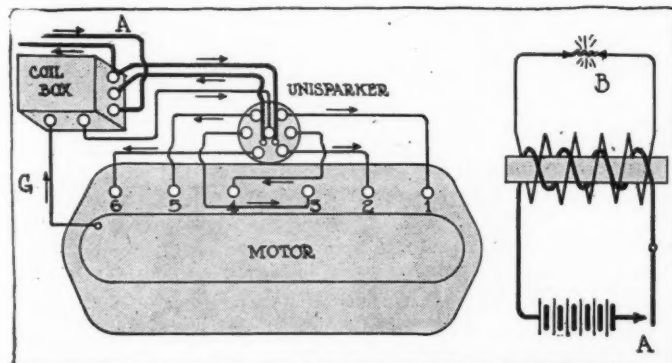


Fig. 6—Atwater Kent unisparkar used on light six Chalmers. Right—Principle of system. Fig. 7—Left—Wiring diagram

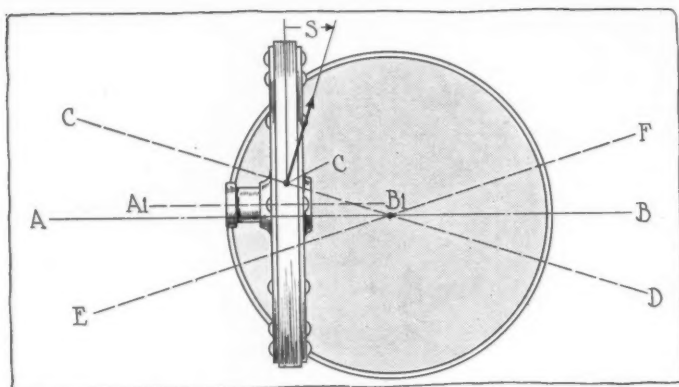


Fig. 1—If the jackshaft is not in line with the center, the disk will crawl

## Friction Drive for Cyclecars

Gives a Wide Range of Gear Ratios—  
Easy to Assemble and Repair  
—Some Requirements

**F**OR light powers and small motors as used in light-type cyclecars friction drive has many attractions, in that it is cheap to install, and gives a wide range of gear ratios so that the motor can run at its best speed. With the small sized disks and spurs which can be used with the 10 to 12 horsepower cyclecar motors the twist and thrusts on the frame and car construction are not high enough to distort, and are easy to take care of. The assembling of a friction is easy and with 12 or 14-inch disks the layout can be arranged in a solid cast frame so that the wheel will be in line.

### Thrust Is Often Neglected

In fitting friction drive you must first recognize the factors that must be taken care of. One of the least recognized on the part of the novice is the thrust. I have seen cyclecar friction drives with a bicycle type thrust bearing back of the disk, and with small plain bearings on the jackshaft. The thrust back against a disk on low gear may reach as high as 800 or 900 pounds and the thrust bearing should be capable of caring for a continuous 600-pound load. The shafts and remainder of the mechanism must be designed for this also, with a 400-pound thrust on the plate in high-gear position. This presupposes more rigid construction than was used in some of the earlier cyclecars in America, and is still a fault with some of those trying to use friction abroad.

The name friction drive carries with it the thought that the power is transmitted by friction between the surfaces of the wheels of the mechanism. One of these, the disk, is generally cast iron or an aluminum alloy and the follower or wheel faced with friction paper of the Rockwood variety. The pressure of the wheel against the disk transmits the power and the wheel can be thrust against the disk in any position from the center out to get the different gear ratio. While theoretically there is a slippage and waste of power between the inside and outside diameters the loss is well within practical limits and compares on high gear with an ordinary gear reduction and on low with a planetary gearset. The advantage is that any ratio between high and low can be had to fit the gear ratio to the motor speed and power, whereas in a conventional gearset only certain definite gear ratios can be used.

When the parts are not properly set, however, this con-

dition does not obtain in practice but the set resolves itself into a one-speed affair, or a two-speed one at best.

If the jackshaft is too light and springs back under pressure the disk will tend to run into low and on low gear one cannot get enough pressure to drive properly. The jackshaft for a 14-inch disk should be 1 1/4 inch in diameter so that there shall be no springing even on low.

### Shaft Axes in Same Horizontal Plane

If the friction is to work well the jackshaft must be in the same horizontal plane as the main shaft. Otherwise the wheel will crawl and will not stay put.

This is shown in Fig. 1. Here the wheel is shown against the disk, the line A-B being the horizontal through the center of the disk. The wheel is shown with its center line dotted at A'-B'. The point of contact of the wheel with the disk is indicated by the point C.

The disk is whirling when the power is being transmitted and hence the line of thrust is on a line passing through the center of the wheel. This will be the line C-D in the drawing, and the lines of motion of the disk at the point or line of contact are all circles with center at the center of the disk and whose thrust line is the tangent shown by the arrow from C. This line thrusts in as well as up so that the wheel rolling on the disk above the line A-B will tend to roll in toward the center of the wheel. For the same reason if it is on a line below it will tend to roll out, the line E-F being its line of contact.

Thus the line of the main shaft of the disk must pass through the center of rotation of the jackshaft to obtain the right rolling motion.

In practice the wheel can be about 1-64 inch below the center so that the wheel will tend to creep out a little. This will let it roll true unless the foot pressure is very light and thus without touching the change lever one can start on low and by working the clutch pedal alone gradually run into high, yet when pulling hard on low the wheel will not creep up.

Another condition which will cause creeping outwards is a springing main shaft. This shaft should be held in two bearings very solidly. If the main driveshaft springs the wheel will set at an angle with the disk when viewed from

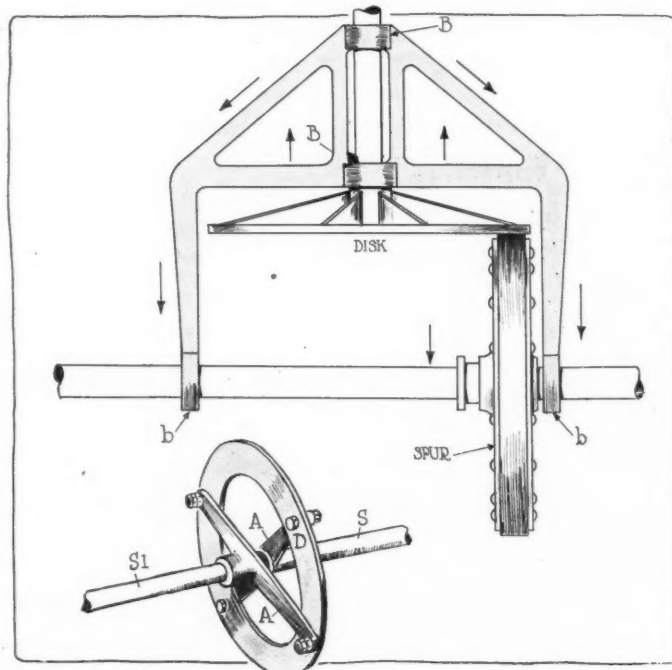


Fig. 3—Upper—Form of frame which can be used with small disk construction. Fig. 4—Lower—Plate steel extension joint for friction shaft



the top as shown in Fig. 2. The position will throw a side thrust on the wheel, as shown by the arrow, and the wheel will creep to the outside or to high position.

The writer recently drove through some 10 miles of heavy roads at night when he could not well pick a track and when sand required a real pressure on low gear the friction wheel ran up to high and stalled; so that to go at all it was a process of continually throwing into low, getting a start until the wheel crawled to too high a gear, and then releasing the clutch and throwing into low again. The fault has been remedied.

With the small 12 or 14-inch disks used in the cyclecar the whole friction unit can be held in a casting so that it cannot get out of line, and this casting suspended at three points. In such an arrangement Fig. 3, the jackshaft is held in small ball bearings at *b, b*, behind the disk is a larger bearing, a double row thrust at *B*. The fourth bearing is a single row annular at the back of the triangular portion at *B*. This arrangement takes care of all the thrusts, and keeps things in line. For purposes of adjustment the small jackshaft bearings can be fixed to raise or lower, with a threaded adjustment.

The shaft of the friction disk with this arrangement will have to move to press the friction disk against the wheel. In some constructions the wheel is moved by eccentric jackshaft bearing housings but this is a more expensive construction and gives more likelihood of the jackshaft changing level as the paper wears away.

Fig. 4 shows the usual disk joint used with cyclecar frictions, this consisting of a ring of flexible steel sheeting *D* fastened to arms *A, A* from the shaft *S* on one side and the motor shaft *S<sub>1</sub>* on the other. The shafts are held central generally by the end of one shaft being cut to smaller diameter and fitting into a hole in the other, or by suitable sockets.

These joints are made with two and three arms. With three arms the central socket is not necessary.

To get the pressure of wheel against disk a pedal arrangement is generally used, Fig. 5. Pressing on the pedal works the thrust arm *L* through the rod. The pressure of the pedal therefore engages the clutch, the reverse of ordinary car practice. The harder you press on the pedal the harder the pressure and the more the wheels will pull.

#### Two Pedal Actions to Release Clutch

When the correct pressure is obtained a pressure of the arm *A* upwards by the spring *S* shoves the notches on the pedal arm *A* against a ratchet plate *R* on the footboard, thus holding the friction at the pressure. Pushing to a deeper notch gives more pressure. To release, the pedal is pressed enough to release the catch, the foot and pedal dropped a little and the pedal catch is thus let out again. It takes two actions of the foot, one down and one out, to release the clutch.

In a car used by the writer the friction is made with two pedals. The right one releases the clutch effect and sets the brake, the left one gives the thrust. When one pedal goes up the other comes down, so that the action is simple and easily understandable. Push the right pedal and you stop, the left and you start.

Spring systems for giving pressure to the disks are inefficient. One may want 600 pounds pressure on low for the heaviest pulling, and but fifty for slow running; he may want 150 on high for open throttle high speed work, and but 10 pounds for boulevard work at high with low throttle. The thrust depends on both gear ratio and throttle position. If the spring pressure on high is 150 pounds then it is too stiff for easy running and hence wearing the friction more than is necessary. The driver who is used to the work will have plenty of thrust in starting to prevent slipping and thus wear, and when once up to high and on speed he will release the pedal to find just the place where the friction

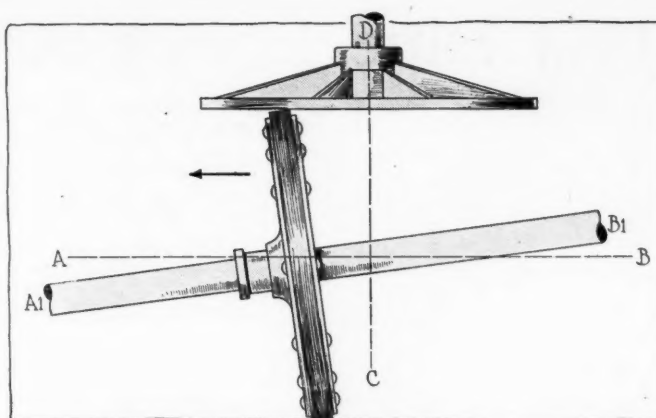


Fig. 2—The friction wheel must run at right angles to the disk

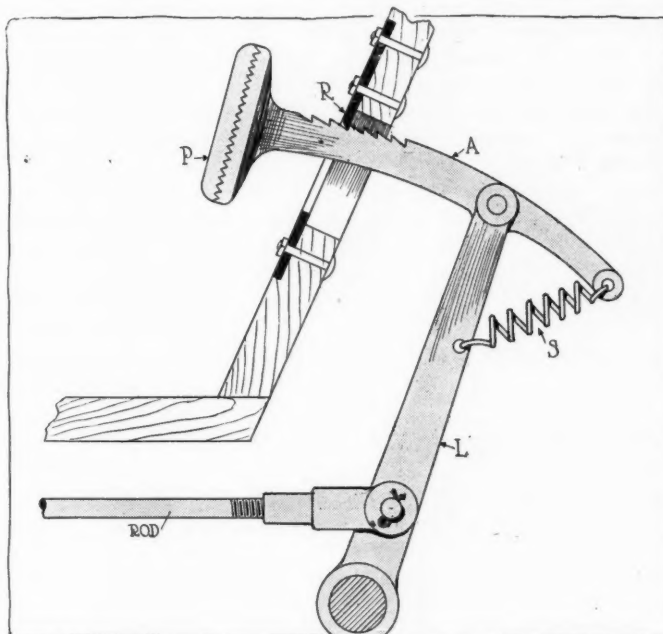


Fig. 5—Conventional friction drive control pedal

pulls best without slippage. With a two pedal system one can feel the pressure very accurately.

The gear ratio from the jackshaft to the rear wheels for the ordinary cyclecar and motor should be at least 4 to 1, for the ordinary cyclecar motor is a high speed motor and should be given a chance to show what it can do. The lower the gear and the higher the speed of the friction for the horsepower given the more efficient the drive.

For the usual 12 or 14-inch disk the width of the paper is 1 inch, and the follower diameter the same size as the disk.

Properly applied, friction drive has real advantages. Its one disadvantage is that it is possible to wear flats in the paper but after a 10-minute lesson on handling the drive one need never wear a flat. If one tries to start the car in sand on high gear and forces the wheel and disk together with full pressure and lets them slide, the paper will burn at the point of contact. If there is the least rolling motion between the two so that new paper is coming into contact before the touching paper gets hot enough to burn, then there is no trouble. The minute a car is in motion at all there can be no burning of the paper.

In a properly applied friction on a 700-pound cyclecar, having 12-inch disks and a motor under 15-horsepower there should never be an occasion or condition where even a medium proficient driver could burn a flat in the wheel, any more than a beginner would burn out the leather clutch of a big car.

# 1914 Blue Books Are Greatly Amplified

The Five Volumes Contain Many New  
Touring Routes and Charts—Two-  
Page Map of New York a Feature

**N**OW that spring is really here every automobile owner has taken his car out of storage and many of them are already taking tours. Naturally, the automobilist delights in going to different places on his short, week-end trips, in finding the new, the picturesque and the beautiful, and for his longer journeys he wants to know road conditions, hotel accommodations, etc. With these things in mind, he will greet the announcement that all five volumes of the Automobile Blue Book for 1914 are to appear simultaneously, embodying the innumerable changes and additions made necessary by the growing activity in highway improvement.

## Cover U. S. and Canada

The territory covered by the Blue Book comprises practically all of the United States and such portions of eastern Canada as present opportunities for automobiling. This great territory has, for convenience, been divided into five districts, each covered by a separate volume. Whenever one district borders on another, the inter-volume route may be found in both volumes. Thus the automobilist en route from one district to another will find all routes complete. The divisions of the country and the respective volumes are:

New York State and Contiguous Canada (Volume 1);  
New England, Province of Quebec and the Maritime Provinces (Volume 2);  
New Jersey, Pennsylvania and the Southeast (Volume 3);  
The Middle West (Volume 4); and  
The Mississippi River to the Pacific Coast (Volume 5).

## Vol. 1—New York and Canada

The recent authorization of the expenditure of \$100,000,000 on the highways of the Empire State has resulted in so great an extension of the road-system that an enormous mileage has had to be re-surveyed by the Blue Book cars, and the text matter entirely rewritten or revised. Fifty new routes have been added in 1914, most of them connecting links which had hitherto been impassable. The macadamization in some parts of the State has so stimulated touring that the textual

description has had to be supplemented with new detail maps—notably in the north, along the St. Lawrence.

Welcome additions to the list of routes in this volume are a quartet which lead into New England. One runs from Nyack to Danbury; another from Kingston to Norfolk, Conn.; a third from Catskill to Norfolk; and the fourth from Albany and Troy to Williamstown, Mass. For the first time the state road is open its entire length from Saratoga Springs to Plattsburg, and this link, in conjunction with the new King Edward Highway, provides an unbroken chain of macadam from Washington to the Canadian metropolis.

In Canada the road has been re-surveyed between Montreal and Ottawa, and a thoroughly practicable connection has been added from the Capital to Ogdensburg, N. Y.

## Vol. 2—New England

It might seem as if road conditions in New England had long since reached a degree of stability which would make it unnecessary to incorporate any changes in this book. Such is far from being the case, however, and Volume 2 shows quite as many improvements as the other four. These six States seem insatiable in their efforts to extend the network of their public highways, and great progress is reported, particularly in the three northern commonwealths. Thus the New England book, to keep pace with this progress, contains this year no less than half-a-hundred new routes, to say nothing of changes in quite twice that number which were occasioned by recent construction.

To meet the demands of travel there has been a complete revision of the Cape Cod section, with the addition of about a dozen new lines from and to nearby touring centers. In central Massachusetts, too, one may find numerous new cross-routes, among them one from Providence direct into Lowell and Nashua, and another from South Framingham to Fitchburg.

In the Northwest there has been added a new and better route between Burlington and Montreal, via the Islands of Lake Champlain and the

King Edward Highway. Tourists seeking an entrance into New York state will find several convenient routes never before published. One of these runs due west from Hartford, Conn., to Kingston, N. Y., by way of Norfolk, Lakeville and Pine Plains. Another runs from Norfolk to Catskill, and a third from Danbury to Nyack.

Among the new maps are two showing the best streets to use in traversing those important route centers, South Framingham and White River Junction. The Cape Cod detail map is greatly improved and is indispensable to a proper understanding of the criss-cross of macadam which covers that peninsula. Strangers to New York City will appreciate the insertion this year of a two-page map, giving in great detail most of the important landmarks of the Nation's metropolis.

## Vol. 3—New Jersey and Pennsylvania

So much new matter has been incorporated between the blue covers of this book that no brief review can thoroughly cover it. In Pennsylvania, the gradual assumption of the ownership of the turnpikes by the state has resulted in a vast improvement in the pavement, and the corresponding abolition of the anachronistic toll-gates will prove a grateful change from the former archaic extortion. In the Southwest corner of the state are a number of new routes—until this year almost impassable to motor-traffic; and two new connections to Cleveland will be welcomed by west-bound tourists.

Of all the changes noted, perhaps the most important is the addition of a section devoted to the eastern shore of Maryland. That commonwealth has been unceasing in its efforts to keep up with modern demands, and the authorities are to be congratulated on the success of their efforts. Farther west, they have at last put into first-class shape the old National Road, which runs from Baltimore to the Ohio River at Wheeling. This fine old turnpike traverses the state from end to end, crossing several mountain ranges, and passes through a country recondite with memories of Washington, Lee, Stonewall Jackson and Sheridan.

In the South there are numerous changes and many welcome additions. A chain of new routes runs from White Sulphur to Knoxville, via Bristol; another from Greensboro, N. C., via Asheville to Knoxville and Chattanooga; and a third provides an important connection between Atlanta and New Orleans, by way of Montgomery, Mobile and Pass Christian.

One more feature will not lack appreciation. That is a new trunk-line along the Southern Tier of New York State, from Binghamton to Jamestown,



by way of Elmira and Hornell. These cities have for years been included severally in the scope of Volume 3, but not until this year have they been connected.

#### Vol. 4—Middle West

The floods in Ohio and Indiana in the Spring of 1913 did so much damage to the highways of these states that conditions had not been restored to the normal before the publishers were compelled to put last year's book on sale. Therefore it has required a herculean effort in the intervening twelve-month to amass the wealth of data concerning the reconstruction of bridges and culverts and the relocation of grades and curves.

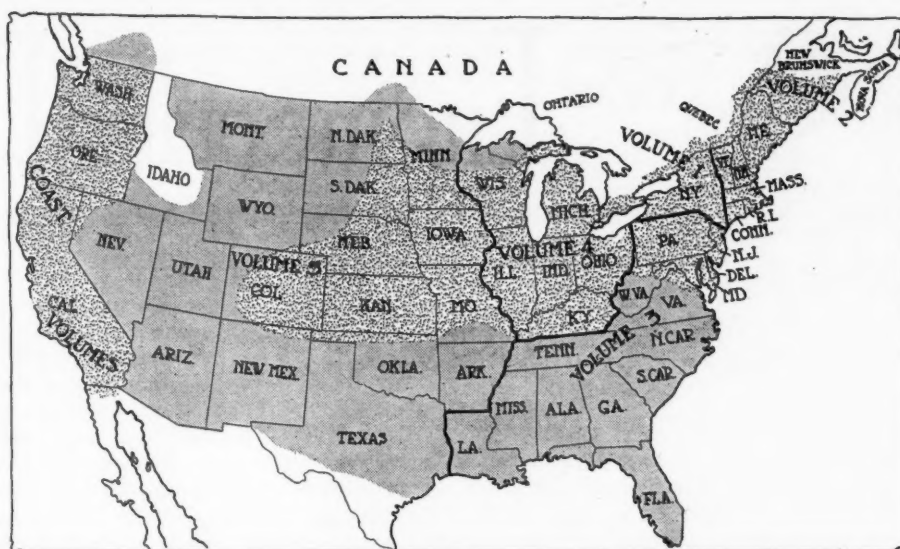
The several states to whose roads this volume is dedicated have entered upon a period of road-building unprecedented in the history of the country, and at last it is possible to tour this section with almost as much comfort as in that motorists' paradise, New England. In line with these improvements there has been a concomitant increase in adequate hotel and garage accommodations; and the stranger would be surprised at the number of splendid hotels which have been built in the last few years to meet the demand of automobile tourists.

Distances are, of course, great, but on the other hand, towns are plentiful, and as the contour of this section is for the most part level, one can reel off a surprisingly large mileage without experiencing fatigue.

The many lovely towns described in this volume include the beautiful shores of the Great Lakes, the hills of Central Kentucky, the myriad ponds of Wisconsin, and a wealth of attractive inland resorts in Indiana, Ohio and Illinois. Of a totally different sort is the enjoyment to be derived from a comparison of the scores of growing cities and their varied efforts at city planning and the institution of a healthy and aesthetic growth.

#### Vol. 5—West of Mississippi

In view of the approaching opening next year of the Panama-Pacific Exposition at San Francisco, the territory covered by this volume—from the Mississippi to the Pacific Coast and from Canada to the Rio Grande—is assuming an importance more in keeping with its vast area and its inexhaustible store of natural wonders. The propaganda for the Lincoln Highway have so largely monopolized the attention of the country that one is prone to forget the several excellent alternates, which vie with one another in offering to the transcontinental traveler a concatenation of scenic attractions unsur-



Map of the United States and sections of Canada covered by the five 1914 Blue Book volumes. The dotted portions represent the territory thoroughly covered, while the shaded portions are partially covered. White spots indicate territory not covered, as routes are only in preparation

passed in any other portion of the globe.

Nor is there any dearth of historical interest. The Santa Fé Trail is substantially the same as that traversed by the army of Forty-niners who preferred the overland route to the long journey around the Horn at the time of the gold rush to California. It is chiefly used in winter, when the more northern routes are impassable on account of snow. The other trunk-lines are less difficult and present varied attractions which have won for each its adherents. All of them, however, are now thoroughly practicable, and can be safely negotiated by almost any style or make of car. The states, counties and towns are displaying the utmost enterprise in building new roads and improving the old, and hotels are springing up like mushrooms to take advantage of the ever-increasing stream of motor-travel which westward wends its way.

The lure of the majestic Rockies, the glories of the Yellowstone and the Yosemite National Parks, the dread romance of the Painted Mesas and the Great American Desert, the snowy peaks of the Sierras and the azure-and-coral coast of Southern California—these are but a few of the more cogent reasons for the unprecedented awakening in the automobiling public of interest in transcontinental touring.

All these evidences of the majesty of Nature are made accessible by the explicit text of this volume, and they may the more readily be approached by the traveler from the East, inasmuch as a number of trunk-lines from route-centers in Volumes 3 and 4 have been included in this book (for example, from Chicago, St. Louis and Memphis), which give a wide range of

optional gateways into the wonderful touring country generally referred to as the Great West.

#### Cyclecars in 6-Day Trials

PARIS, April 16—European cyclecars will be put to their first severe public test in the 6-day trials to be held in the French Alps around Grenoble from August 3 to 9. The trials are international and are open to motorcycles as well as to cyclecars. The latter are designated as machines having a cylinder volume of not more than 1,100 cubic centimetres. Four daily stages will be made through the Alps, distance being from 135 to 155 miles. There will be a 200-mile run from Grenoble to Dijon and a final daily trip of about same distance from Dijon to Paris, where the competition will end.

The routes through the Alps will comprise the most difficult passes in Europe. The Lautaret and the Galibier, nearly 9,000 feet above sea level, and the whole chain of the Grande Chartreuse mountains will be covered. These passes are only free from snow 3 months in the year, and although the roads are well made and well kept, the climbing of the heights is considered the high-water mark of efficiency in the European automobile world.

It is probable that the speed imposed will be 19 miles an hour with controls every 30 miles and a loss of points for arrival 5 minutes before or 5 minutes after the official time. The entire distance will have to be covered without the changing of any parts, spark plug and tires not being considered changes. Spare parts can be carried, but if they are used points will be deducted. On finishing at Paris the machine will be subjected to a technical examination.

# The Engineering Digest

## Discussion of Front Wheel Brakes Resumed on Grounds of Safety Comfort and Final Economy

### BLOCKING OF WHEELS AT ALL EVENTS TO BE AVOIDED

EVERY now and then the question of front brakes comes to the surface through the action of some well-known manufacturer setting aside the thought of first cost and complication and applying front brakes to one of his models, or to some special car, to try out the plan and see if the public is not ready to recognize its advantages.

Front brakes, while not nearly so complicated, are in the same class with four-wheel drive in so far as neither of the two features is looked upon as strictly necessary for ordinary motor vehicle work, and there is a further kinship in the coincidence that both features become specially desirable when the ground is so slippery or loose that traction and steering are endangered. Something more than mere freedom from trouble is implied in the advantages which crop out under these difficult conditions. A car with four-wheel drive may, for example, as conclusively shown in the recent military tests of four-wheel-drive trucks in France, transport a larger load than an ordinary car over any route on which there are stretches of soft or rough ground. If it is also equipped with four-wheel brakes, as such vehicles usually are, it may be driven faster where the road conditions are doubtful. It can be stopped more surely and more rapidly if danger arises. Moreover, if these properties are admitted, it follows that such precautions as that of using knobby tire treads or traction chains perhaps may be dispensed with under the same conditions under which they would be necessary for cars of the standard construction, and also that there may be an economical gain in distributing the driving and braking stresses on twice as much material, as compared with that which usually has to endure them. More particularly, as unaided rear brakes in practice nearly always are worked so hard as to block the wheels—thereby turning the costly rubber tires into brake shoes—while brakes on all four wheels always can be applied softly, an important economy

may be credited to four-wheel braking on this score, independently of whether four-wheel drive is also used.

With a view to public safety in the street traffic, the superior control obtained by braking both in front and rear is considered especially reassuring, as many drivers have a natural reluctance against applying the more roughly acting rear wheel brakes until the necessity for doing so becomes very urgent in each case. The subject thus enters for consideration in the Safety-First movement. The effect of the four-wheel brake system to reduce the pitching-movement of the vehicle body—the upward extension of the rear springs and the simultaneous overloading and compression of the front springs—which comes with every sharp retardation, is also a notable improvement, adding to the comfort of drivers and passengers, although the best possible results in this respect depend as much upon the spring suspension of the vehicle and the location of the center of gravity as upon the brakes.

Against the possibility of realizing all these attractive advantages the public and the majority of manufacturers still hold a doubt, however, being not yet satisfied whether front brakes under certain difficult conditions do not interfere with steering or cause new dangers, not existing, or existing only in small degree, with rear brakes alone.

### Experiments Only Begun

So far, the front brakes which have been tried by leading manufacturers, mostly in England, have been of the same type as the ordinary rear brakes, and no attempts have been made at using, for example, vertical brake plates forced against the wheel, as in some coaster brakes for bicycles, although the mechanism for operating a contraction-band or expansion-shoes has proved to be more cumbersome on a front wheel than on a rear one. While the reports of results obtained from a front-brake equipment have been uniformly flattering, it is in the nature of the case that it should not be the results obtained by experts or under ordinary conditions which should count most, but those obtained by the public at large and in emergencies, since brakes are first of all a safety and emergency device. And the feature is not becoming rapidly or widely adopted for stock cars. Continued

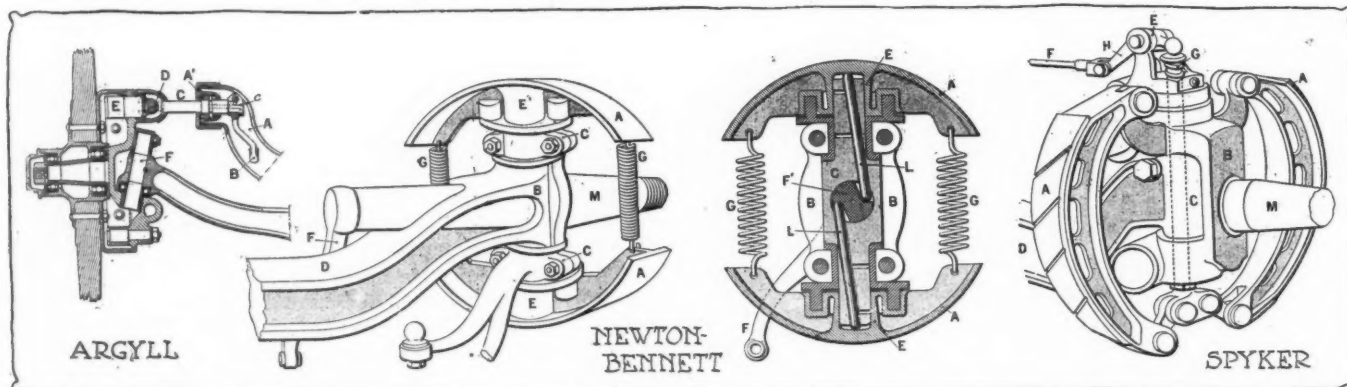


Fig. 1—Argyll front brake, the most widely used device of its class; A frame transverse, A' frame reach, B brake lever, C brake shaft, D universal joint, E cam, F steering pivot, G oil hole. Fig. 2—Newton-Bennett brake, AA brake shoes, B pivot pin, C steering knuckle, D front axle, F brake lever with shaft F' passing through axle; figure to the right shows interior rods LL by which brake shoes are operated, EE cups integral with brake shoes to house the rods LL. Fig. 3—Spyker front brake; reference letters same as for Fig. 2: EH bell lever actuating shaft C and upper and lower toggles. This system results in more uniform contact of brake shoes with drum than can be effected by single cam with either single or double brake shoe pivot.



demonstrations and probably also improvements in the design of front brakes are still required to bring about this result, if indeed the system is ever to be standardized.

#### New Demonstration Promised

According to a recent announcement, the Peugeot firm in France has now decided to equip the cars entered by it for the Lyon circuit—a race to be held in July over a hilly course with many turns—with front brakes, hoping thereby to enhance its chance of winning the race while also furnishing a demonstration in favor of the equipment.

Some French technicians take occasion from this development to go on record, in *Omnia* for March 28, with some reasons for the belief that no special dangers or difficulties are connected with the advantages of four-wheel braking.

It is first pointed out, in accordance with practical experience, that a car's obedience to steering action is much impaired under the present system when the rear wheels are blocked and the ground is slippery. When one of the rear wheels is blocked, or braked much more severely than the other, the result depends again on the adhesion of the wheels

some maladjustment or by the presence of sand in the brakes, one or both front wheels are blocked by the front brakes, while the rear brakes at the same time fail to hold, and the ground is slippery or a steering-movement is made at the same moment, will under these conditions the results be less acceptable than those which would accompany the blocking of rear wheels only—any and all circumstances of speed and road conditions being considered?

Without undertaking to solve this question at present, the French authorities on the subject point to the experience to be gained in the race over the Lyon circuit as likely to furnish new data and present, meanwhile, the illustrations of front brakes which have been used so far; and these are reproduced herewith.

#### Blocked Wheels Obviated

[On the theory that blocking of wheels should be avoided under all conditions of the road surface, the first requirement to be made of front brakes would seem to be the perfecting of an arrangement by which the friction of the brake would be determined by the rotary speed of the wheel. Whether

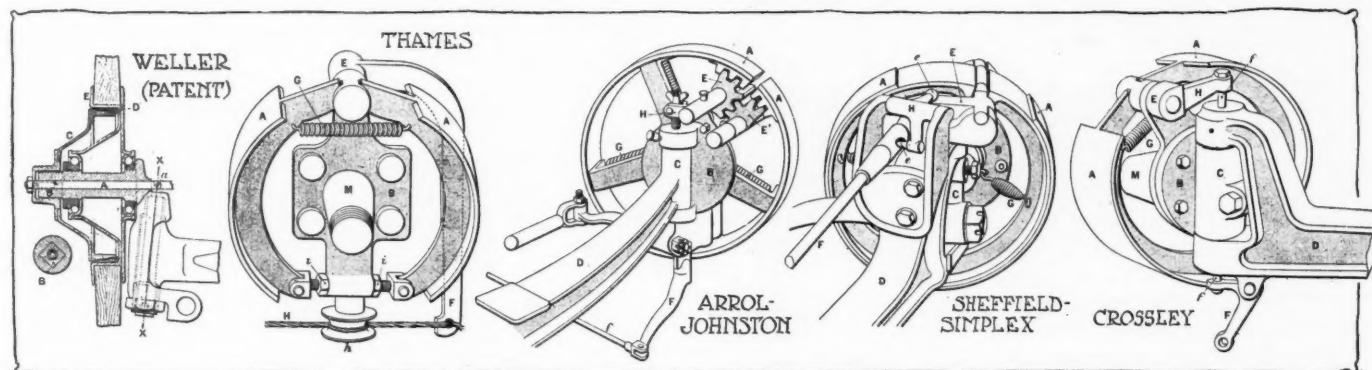


Fig. 4—Weller design (American patent, so far as known not in actual use): A brake shaft through wheel spindle, a cable attachment, B square key on end of A for actuating male cone C, D female cone. Fig. 5—The Thames brake; same reference letters as Figs. 2 and 3, M wheel spindle, H adjustment screws for each brake shoe individually, E cam, Hh cable and pulley. Fig. 6—Arrol-Johnston brake; main reference letters denote same as before; EE' toothed sectors controlling brake shoes. Fig. 7—Sheffield-Simplex brake; reference letters as before; cc flexibly connected levers for operating cams. Fig. 8—Crossley brake; reference letters same as before; cam operated from shaft passed through center of steering knuckle and pivot pin

to the road, but the continued rotation of one of the driving-wheels reduces the irregularity. Similarly, if front wheels are blocked, one or both, or if one front wheel and one rear wheel are blocked on the same side of the vehicle, the steering-action becomes precarious.

The reasoning—as it is presented in the pages of *Omnia*—is not very conclusive and is here rendered only in brief abstract. It is necessarily hampered by the fact that the question involved is always one of the actual condition of the road in each case, since it is the quantitative factors in the condition which determine the resistance to lateral skidding of the wheels. The upshot of the reasoning is that this resistance to skidding is much smaller in the case of a wheel which is blocked than in the case of one which rotates and advances over the ground. And from this fact, which is better established in practice than by any explanation which can be offered for it, the inference is drawn that the important point in brakes is to have them efficient without blocking the wheels. And thus the reasoning reverts to the common-sense conclusion that brakes on all four wheels are better and safer than on two because less friction is required at each of them to absorb a given momentum, and therefore their action may be made less gripping and less likely to block any of the wheels.

A question of degree remains unanswered in any mere reasoning on the subject, and this happens to be exactly the question in which the public is mostly interested, because it is the degree which determines whether accident shall occur or not. This question may be formulated as follows: If, by

this requirement could be complied with in a practical manner by having the brake shoes rotate with the wheel and subject to centrifugal force for regulating their relations to a fixed drum, while having the operating-mechanism one merely restraining or releasing the centrifugal action, seems to be a question in which designers might become interested. The combined use of brakes of this general character on the front wheels with brakes of normal pattern on the rear wheels would, in that case, be one of the possibilities.—ED.]

#### Proposed Device for Avoiding Fire in the Carbureter

WHILE public reference to the disasters which have overtaken Zeppelin airships is tacitly tabooed in Germany, the advocacy of special precautions against carbureter fires which has been voiced there lately is apparently prompted mostly by a desire to avoid such airship accidents as that which occurred at Johannesthal. But also with regard to automobiles, motor boats and aeroplanes is the matter of carbureter fires becoming more important than it has been in the past. The need of filling the cylinders of high-speed motors as completely as possible during the very short period allotted for this process has led to straightening and widening of the gas induction conduits, and this improvement, on the other hand, facilitates backfiring from the intake valves in the cylinders to the carbureter. High-speed valve timing tends to the same result. The use of benzol and

other fuels, which may not burn as rapidly or ignite as readily as gasoline, also makes the presence of a flame when the intake valve is opened more probable. Only the lengthened stroke is to

some extent a favorable factor.

According to Arnold Seppeler of Bingen, Germany, [whose opinions on this point may be compared with those of another noted technician, Von Loew, who was recently quoted on the same subject in these columns], the use of wire screens in the induction pipe is not a good remedy, as the meshes must be

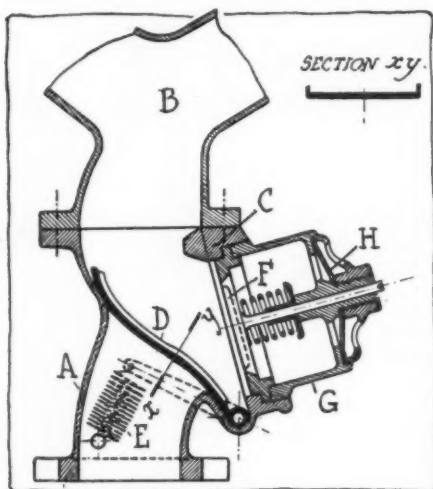


Fig. 9—Seppeler's Fire Shutter

close and a considerable enlargement of the pipe diameter would be necessary to avoid strangling the channel. As the backfires in themselves are harmless and only become dangerous when inflammable materials are within reach, as in the case of dirigible balloons, he holds that the simplest and best method consists in enclosing the carbureter and providing drains for gasoline which is spilled from the jet or jets. He suggests that the carbureter might be designed as an addition to the crankcase with only the induction pipes and the throttle organs visible on the outside, while the air intake should take place through a funnel-shaped screened conduit opening either in the crankcase or in the atmosphere above it.

#### Correlated Questions

[Taking all the air needed for the cylinders from the crankcase, where the air is laden with oil globules, would practically mean the mixing of lubricant with the explosive charge—which may or may not be objectionable in this form—but the breather pipes would also need to be unusually large to facilitate the large in-and-out flow, particularly as they, too, would require screening to exclude dust from crankshaft bearings and camgears. The method formerly used for two-cycle motors, consisting in somewhat compressing the explosive charge in the crankcase before transferring it to the cylinders, was scarcely more objectionable as a means for trapping dust where it would do the maximum of injury to the mechanism. On the other hand, it may of course be questionable what the burning of calcareous or silicious road dust in the motor cylinders—taken there directly from the carbureter without a chance to settle somewhere else—may have to do with the deposits which are formed on the walls of the combustion chambers. Mr. Seppeler's suggestion at least brings up the question of filtering all the air which passes through a carbureter, and of possibly accomplishing the purification by passing it through lubricating oil or through screens moistened with oil, while the method of passing the air through a special conduit for this purpose would render carbureter fires harmless at the same time.—ED.]

#### The Proposed Device

It would also be a simple matter to mount a cup with a drain under the carbureter and continue this cup or basin upward in the form of a wire screen bell inclosing the whole carbureter and easily removable. This would also bring some protection against grit.

If it is considered preferable to prevent flames altogether from reaching the carbureter, it is clear that the provision to this effect must be applied in the induction pipe, where it must not cause too great resistance to the gas flow; and it must be adapted to interrupt all connection between cylinders and carbureter at the moment when a flame might pass. It must be preferable to have all the induction pipes connected to a chamber in which the device is placed and to which the carbureter is bolted on the other side.

Fig. 9 shows an arrangement which might be found suitable. The chamber A is connected with the intake manifold B—which may be cast in the block or external—and contains the gate D which is kept closed by the light extension spring E when no suction from the cylinders takes place. A very slight depression in the manifold opens the gate, but its movement is limited by the lug C, so that air pressure can get action on the back of it. If now an explosion flame shoots from the intake valve of one of the cylinders, either the gate is already found closed or it is closed by the air current preceding the flame. To provide an exit for the ignited gases and quickly establishing the equilibrium needed for the next carbureter action, an outwards opening valve F furnishes a passage into the valve box G which is separated from the atmosphere by a safety screen H. The spring of this valve must of course be very light, while its diameter should be generous and its stroke short.—From *Der Motorwagen*, March 20.

### Automobile Body Frames Plastered with Fibromonolith

AN invention which looks American is hailed in France as likely to revolutionize automobile body building. It is based on the special properties of a composition substance called fibromonolith which is a cement containing powdered wood, it is stated, and of considerable hardness and toughness. The French rights have been secured by Th. Botiaux, carriage builders, who employ the substance as indicated in Fig. 10.

To the members of the wood frame of the vehicle body strips of split cane *a* are tacked. They serve to maintain a small space between the wood and panels of wire cloth which are nailed to it, on top of these strips. The wire cloth is given whatever curve the panel should have by hammering. The wet paste of fibromonolith is then plastered upon the wire cloth with a trowel, entering the mesh and coming in contact with split cane and the wood frame to which it adheres. A layer 5 millimeters thick is used. After it has dried and set, it can be smoothed on the outside by planing and sandpapering. Thereafter it may be simply varnished, in that case showing a leathery grain characteristic of the

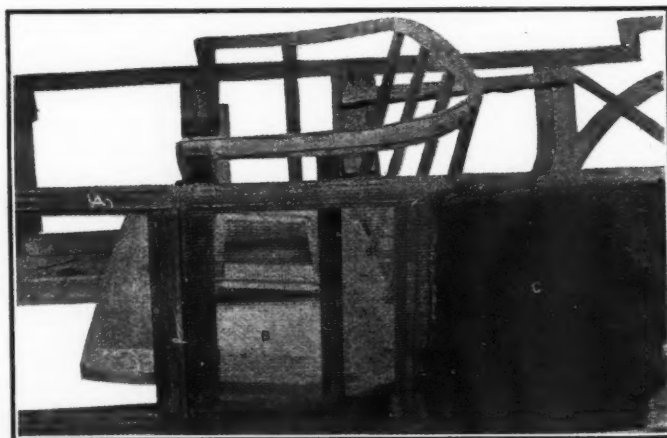


Fig. 10—Process of forming body panels of wood cement



substance and said to be not unattractive, or it may be treated as wood, being both painted and varnished. Coloring matter may be mixed with the paste in advance, if desired. The substance is said to be incombustible and insensitive to the action of water, heat and cold; also non-vibratory and therefore silent.

A vehicle body formed in this manner has no joints, and moldings may be shaped in the coating substance wherever desired and so as to be integral with the structure. Repairs can be made as patches are made on a plastered wall. The strength is said to be entirely satisfactory.—From *Omnia*, April 4.

## Principles Which Must Be Followed in Lighting and Starting

ONE of the German companies manufacturing electric lighting and starting equipments challenges all experts to criticise the principles upon which the equipment it offers has been designed. To facilitate the critic's work, these engineering principles have been summarized. While none of the large competing companies in Germany will dispute the challenge directly, for fear of advertising the challenger, the summary may here serve as a convenient basis for an argument which would be useful, and a translation of it is therefore given herewith:

1.—*Lighting Machine*: For reliability and durability of the service only generators which keep the voltage constant can be considered. Only a generator with regulation of the voltage can charge a battery properly, in accordance with the data of storage battery practice. The requirement is that the exhausted battery shall receive a strong current at first and one which thereafter automatically becomes weaker, as the charging progresses. Generators which continue to send the same current into the battery may destroy its plates.

2.—The weight of a generator for an automobile should not exceed 15 kilograms, and its capacity must be at least 150 watts.

3.—It must reach this maximum capacity at a vehicle speed as low as 20 kilometers per hour (corresponding to an average of 600 motorshaft revolutions per minute) and must keep it up at all higher speeds.

4.—The regulation of the voltage must be so accurate that the lighting of the vehicle can be supplied directly from the generator, without assistance from the battery, at all speeds between 600 and 2,600 revolutions of the motorshaft.

5.—Only such systems should be used with which the battery serves merely as a reserve for furnishing current for the lamps when the motor is not running and for starting; that is, the battery should not be called upon to keep the generator current constant. This requirement is met only in a generator with automatic regulation of the voltage.

6.—The generator must be self-polarizing; that is, only two wires must be used for connecting the generator and the battery. It must be immaterial at what pole of the battery or of the generator these wires are connected, so that no possibility exists for making a wrong connection by dismounting and remounting of the equipment. Such systems are available.

7.—*The Motor-Starter*: The electric motor must be capable of effecting ignition by the magneto, without recourse to ignition from any battery, even with the coldest weather; that is, it must turn the vehicle motor at the rate of at least 100 revolutions per minute and keep up this speed for some length of time.

8.—*Headlights*: When the standard parabolic reflectors are used for the headlights, a 6-volt system presents advantages over any system of higher voltage. Because the filament of a 6-volt lamp is shorter and thicker than that of, for example, a 12-volt lamp. The lamp is therefore easier to focus and considerably more durable.

9.—By the adjustment of the light it should be possible to survey the street at a distance ahead of about 40 meters and for a considerable width; that is, aside from a strong distance-light, the headlight should also provide a sufficient sweep of less concentrated illumination. (Many catalogs give misleading information on the reach and light values of the illumination). The headlights must be dustproof and waterproof and should be provided with an adjustment for placing the filament in the focus of the reflector.

10.—*The Battery*: For lighting and starting of automobiles specialized batteries are required which will endure discharging at high rates. Such batteries work with an electrolyte of high acidity and present the great advantage that only water should be used for replenishing them.

11.—The use of a 6-volt battery is preferable, as it is lighter than a 12-volt battery. Further, batteries of the required type require a slow charging in order to maintain their capacity and protect their plates, and it has been determined by tests that the charging-current for a 6-volt battery must be of at least 4 amperes. Theoretically one-half of this amperage should be sufficient for a 12-volt battery, but in practice a current of less than 3 amperes has been found useless. According to these facts, the current consumption of a 6-volt battery is 24 (4 x 6) watts, and that of a 12-volt battery is 36 (3 x 12) watts. With a 150-watt generator for 6 volts there remain, then, 126 watts at disposal for the required work. The 6-volt system allows thus at all events the use of more powerful lamps, giving a better light, and at the same time offers a guarantee that the battery will remain fully charged during travel despite of the use made of it.

12.—The voltage of a charged battery cell is at least 2 1-2 volts, and the voltage at the terminals of the generator must therefore be 2 1-2 volts multiplied by the number of cells; that is, with a 6-volt system 7 1-2 volts and with a 12 volt system 15 volts. If the battery shows a lower voltage, it is empty and exposed to rapid deterioration.—From a German two-page advertisement.

## Hot-Short Bronze Improved by Admixture of a Little Lead

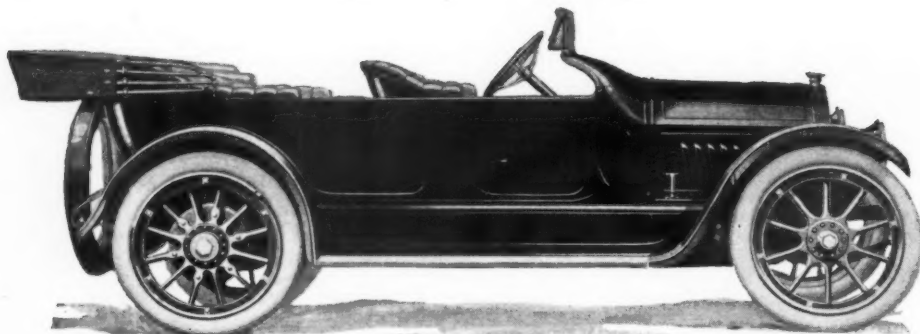
AT the annual general meeting of the Institute of Metals, held in London on March 18, last, John Dewrance presented a paper giving the results of a large number of experiments which go to establish the fact that the addition of a half of one per cent. of lead preserves the strength of bronze up to a temperature of 500 degrees Fahrenheit, while without the lead it loses its strength at 350 degrees. He suggested that, as lead has this effect, it is probable that further investigation might prove that some other ingredient might preserve the strength of bronze at higher temperatures as well.

At the same meeting there was presented an interesting paper by Cecil H. Desch, lecturer at the university of Glasgow, on the solidification of metals from the liquid state. It throws light on crystalline formations and the so-called foam structures and is reproduced, with illustrations, in *Engineering*, beginning March 27.

## Harmonic Vibrations in Factories

An illustrated treatise presenting a graphic method for calculating the critical number of revolutions for a loaded shaft occupies six pages in *Zeitschrift des Vereines Deutscher Ingenieure* for January 31. As the load is supposed to be constant and the flexions of the shaft are supposed to be calculated in accordance with the load, the application of the method to automobile motorshafts would be complicated and uncertain, however. The nearest practical interest relates to high-speed tool-driving shafts in factories.

# Good Engineering in New Cole Four



Side view of the new series ten-four which sells for \$1,665. Some of the features of the new car are the Stewart-Warner vacuum fuel feed, the new windshield and the new tire carrier

**Weights 300 Pounds Less  
Than Previous Model  
—Fuel Consumption  
10 Per Cent. Lower  
—\$260 Less in Price**

**M**ODERN engineering developments show a great influence in the new Cole, called the series ten-four, which shows a reduction of almost 300 pounds in weight over the previous model, and a gain of 10 per cent. in fuel economy, the price being \$260 lower, the new car selling at \$1,665. The fact alone that a weight of nearly 300 pounds has been cut from the car without changing the motor, clutch, gearset and the rest of the chassis, except the wheelbase, springs and wheels, stamps it as a bit of clever engineering. The new fuel system which is claimed to have brought the reduced fuel consumption is the Stewart-Warner vacuum feed which was described in THE AUTOMOBILE for April 16. With this system the fuel tank is maintained at the rear of the chassis, but the feed to the carburetor is by gravity from an auxiliary tank in the dash.

## Wheel Sizes Are Reduced

The new series comes through with a wheelbase of 113 inches instead of 120 as before and the front wheels instead of having twelve spokes have ten, the rear wheels remaining the same. The wheel size all around has been reduced from 34 by 4 1-2 to 34 by 4 reducing the tire size accordingly. The sidelights have been eliminated and new Solar headlights used which incorporate two bulbs, one a 21-candlepower and the other of 6 candlepower. These bulbs may be used separately or together.

The elimination of the sidelights and the reduced wheel and tire size has caused a drop of 65 pounds in the car weight.

## New Type of Tire Carrier

A new type of tire carrier has been adopted which has reduced the weight 10 pounds, the series ten having a pressed-steel saddle holder instead of the drop-forged double carrier used on the series nine. The radiator core has been changed from 1-4-inch section to a .3-inch section and instead of using a polished rim the rim is painted. The new radiator weighs 9 pounds less than the old one. A new oval gasoline tank of 16 gallons capacity is used instead of the square tank of 22 gallons capacity reducing the weight 25 pounds. This tank is not fitted with a magnetic gauge as the series nine, but instead has a large filler opening through which the bottom of the tank may be seen.

A new Exide battery is used in connection with the Delco starting, lighting and ignition system. This accumulator is of 85 ampere-hours capacity as against 133 ampere-hours on the old series. The use of the new battery has reduced the weight almost 40 pounds.

The springs and muffler of the car have been made lighter

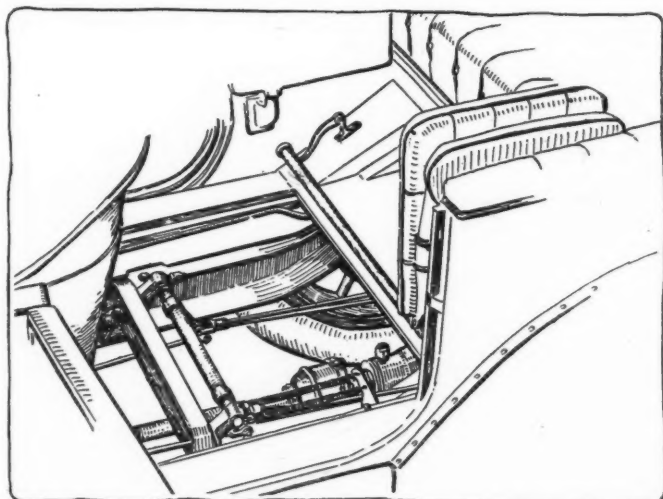
so as to reduce the weight about 11 pounds and the exhaust pipe extension changed from cast iron to seamless steel tubing, giving an added drop of 7 1-2 pounds. The lower half of the gearset case is now aluminum alloy, whereas malleable iron was used previously. The upper portion is still of iron because the shifter gate is fastened to it.

## Tonneau Is 4 Inches Longer

The tonneau has been made 4 inches longer and the leather changed from long grain buffed, bright patent to black pebble grain. The running boards have been cut so as to remove the slight flare before the fenders, thus narrowing the boards about 1 inch, reducing weight and calling for added reduction by the shortening of the running board irons. The linoleum of the running boards, and also of the floor boards, has been made lighter and the top bows and top itself made smaller.

Checking up the equipment we find many pounds have been saved. The clock has been eliminated, as well as the tire pump and automatic air pump for the pressure feed and the windshield changed from a thumbscrew type to a full automatic with 1-piece stanchions. The curtains used are now of Cole make and incorporate some features not previously used. The electric horn is now a Rexo and is lighter than the Delco horn used in the series nine.

Aside from those changes mentioned a few of minor importance have been made to bring the weight down as far



Brake adjustment is an easy matter on the new Cole, as may be seen from the illustration which gives an idea of the accessibility of the arrangement



as possible, the lightening of the body framework being one example. The new Cole weighs 3,615 pounds with water, oil and fuel tanks filled and carrying an extra tire and rim, making the shipping weight of the car about 3,400 pounds, which is almost 300 less than the older model. To show the importance and the result of a reduction in weight, a representative of THE AUTOMOBILE was taken out in the new four and a run made to Johnson's hill, the climbing of which on high gear is considered a feat. The Cole faltered only once, due to improper carburetor adjustment and after this was corrected it pulled up the grade with four passengers, averaging almost 15 miles per hour.

#### Unit Power Plant Refined

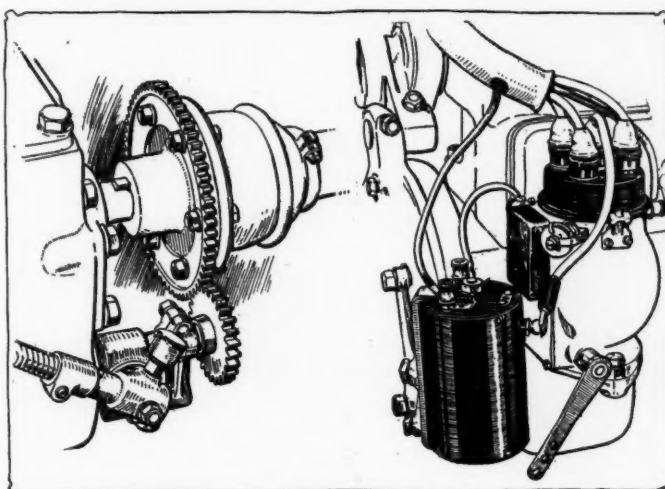
The Cole ten-four retains the Northway unit power plant which was used on the previous models, only those changes being incorporated by the manufacturer which have been necessary for the motor's refinement. The engine is an L-head job with pair-cast cylinder of 4 1-4 by 5 1-4 inches bore and stroke and pulling about 40 B.H.P. On the right side of the unit is the Delco motor-generator and the water pump while on the other side is the Delco distributor and intake and exhaust passages. The pistons are of the 3 plain-ring type with top and bottom clearances of .009 and .0025 to .003-inch respectively. The rings are 5-16 inch wide.

#### Three-Bearing Crankshaft Used

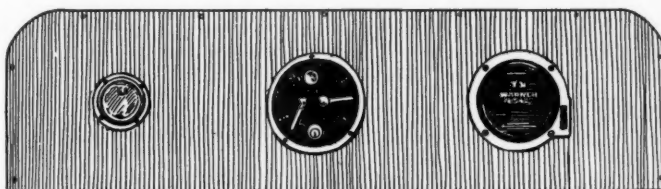
A three-bearing crankshaft is used with bearings in the front, center and rear of the following dimensions, respectively, 1 7-8 by 3 1-2, 2 by 2 3-4 and 2 1-4 by 3 7-8 inches. The crankshaft is flanged to take a 16 1-4-inch flywheel. Connecting-rods are of 40-point carbon steel, heat-treated and are 11 inches long, with a 2 1-8 by 2 1-4 inch plain lower bearing. The end of the crankshaft is fitted with a helical gear which drives similar gears for the auxiliary shafts. The single camshaft is 1 1-4 inch in diameter and is supported by three plain bearings. The valves operated by this shaft are 1 53-64 inches in diameter at the top and 1 49-64 at the bottom, have a 3-8-inch stem and are lifted 11-32 inch, by roller push rods. The crankcase which retains all these parts is of aluminum alloy split on the crankshaft center.

#### New Fuel System Saves 10 Per Cent.

The Stromberg carburetor fitted to this motor is of 1 1-4 inches diameter and has a hot-air connection. The gasoline feed as mentioned is known as the Stewart-Warner vacuum feed in which fuel is drawn from the tank at the rear to an auxiliary tank behind the dash, by motor suction. The auxiliary tank contains two chambers, one being called the float chamber, in which a copper float operates. The system in



At the left is shown the mounting of the speedometer on the driveshaft at the rear of the gearbox. At the right is the mounting of the Delco distributor



The dash on the new Cole is severely plain, the clock used on the previous model having been eliminated

general is as follows: As soon as the motor is cranked a partial vacuum is created in the upper chamber and this causes fuel to flow from the rear tank to the auxiliary. As soon as the chamber is filled the fuel drops to the lower chamber and then out by gravity to the carburetor. The installation of this system has reduced the car weight about 25 pounds and from the results of tests by the factory engineer, has effected a fuel saving of 10 per cent.

Oiling is by circulating splash in which a pump feeds directly to troughs under the connecting-rods and these in turn are drained by scoops at the rod ends. A dash sight feed for the oil is retained. Ignition is by the improved Delco system operating on 6 volts.

The cone clutch taking the motor drive has an 11-degree taper and is 14 7-8 inches in diameter. The clutch hub bearing is an annular ball. Six coil springs hold the clutch in place and spinning is prevented by a brake, faced with Autobestine, operating on the clutch periphery.

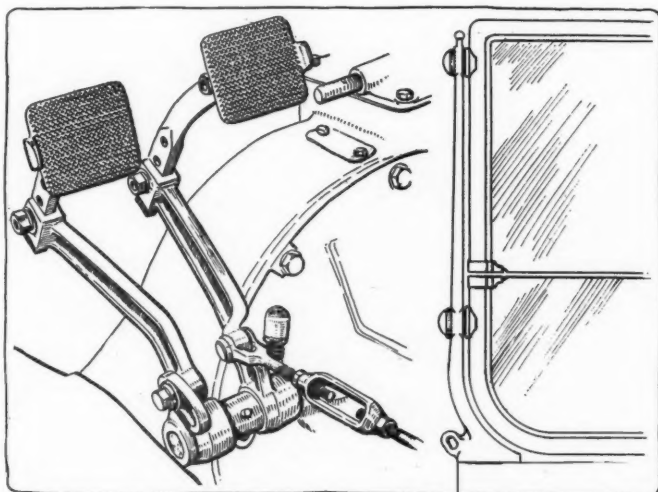
#### Three-Speed Selective Gear

The unit power plant is complete with a three-speed selective gearset with a splined shaft, 1 1-2 inches in diameter. The driving pinion is mounted on ball bearings while the inside bearings are roller. The gear ratios within the gearbox are 3.3 to 1 on low, 1.8 to 1 on intermediate, 4.76 on reverse and 1 to 1 on high.

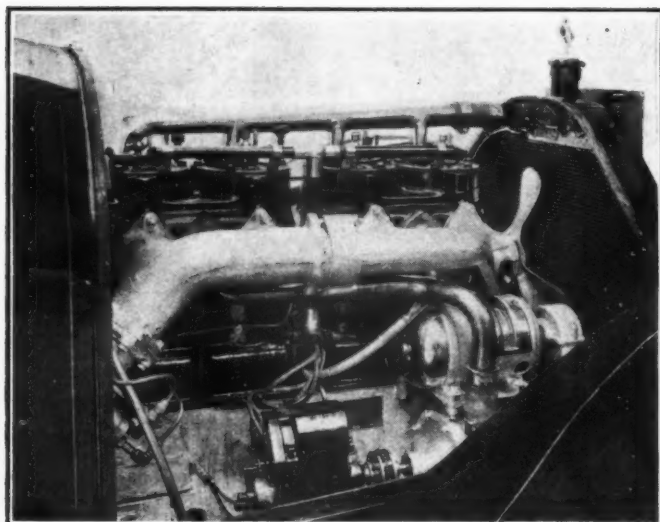
The drive from the gearset is through double Spicer universal to a floating rear axle of Timken make, offering a motor to wheel ratio of 3 13-14 to 1. The axle shafts, which are 1 5-16 inches in diameter, have at their ends a six-jaw clutch which fits into the wheel hub. Front wheel camber is 2 inches and the gather 3-4 inch.

#### Two, Four and Five Passenger Bodies

At present the new series is being marketed in two, four and five passenger styles selling at the same price and going through with the same equipment and features. The standard color is dark green, without striping, and black fenders of characteristic design.



Sketch at the left illustrates the pedal mounting used on the Cole series ten-four, while that at the right shows a part of the new automatic windshield of the one-piece stanchion type



Right side of Stearns four-cylinder motor

## Stearns Six and Four Same for 1915

Changes in Minor Details, but the Two Chassis Will Be Almost Identical with Present Models

**B**OTH the four- and six-cylinder Stearns for 1915, will be the same, except for minor changes, as the present chassis. Several new bodies have been added so that the line now offers eight different types. These include a three-passenger roadster, four-, five-, six and seven-passenger open cars and limousine, landaulet and coupé models. The two chassis are practically identical except in size.

Developments during the past 3 years have been along the lines of chassis and body refinements culminating last year in the adoption of left drive and center control, and a compact and efficient steering column control of carbureter, ignition system, electric lights and Klaxon horn.

All the important features of Stearn's design have been continued. The unit power plant is suspended on three

points and combines a Knight motor, dry plate clutch and four-speed gearset from which the power is transmitted to the full-floating rear axle through a drive shaft with two universals.

The cylinders are cast in pairs. The four has a bore and stroke of 4.25 by 5.5 inches, giving an S. A. E. rating of 28.9 horsepower and a piston displacement of 312 cubic inches. The six has a bore and stroke of 4.25 by 5.75 inches, an S. A. E. rating of 43.8 horsepower and a piston displacement of 489.4 cubic inches.

Ignition is supplied by a duplex high-tension system of Bosch make and carburetion is furnished by a Stromberg carbureter to which fuel is fed from the tank in the rear by pressure. A hot-air pipe is fitted to the carbureter.

### Splash-Pressure Lubrication

A splash-pressure system of lubrication is employed, a gear pump being used to maintain circulation. Cooling is assisted by a pump. The bearing material is babbitt and four main bearings are used.

The Gray & Davis starting and lighting system is used, the generator being located at the front of the motor while the starting motor is placed alongside the gearset, driving the engine through teeth cut in the flywheel.

The gearset is a selective type and provides four speeds forward and one reverse. The speeds are obtained by a centrally located lever. The shafts are carried on roller bearings. Access to the gearbox for inspection is afforded by the removal of the top cover which is the full size of the case. Grease can be introduced by removing a small plug.

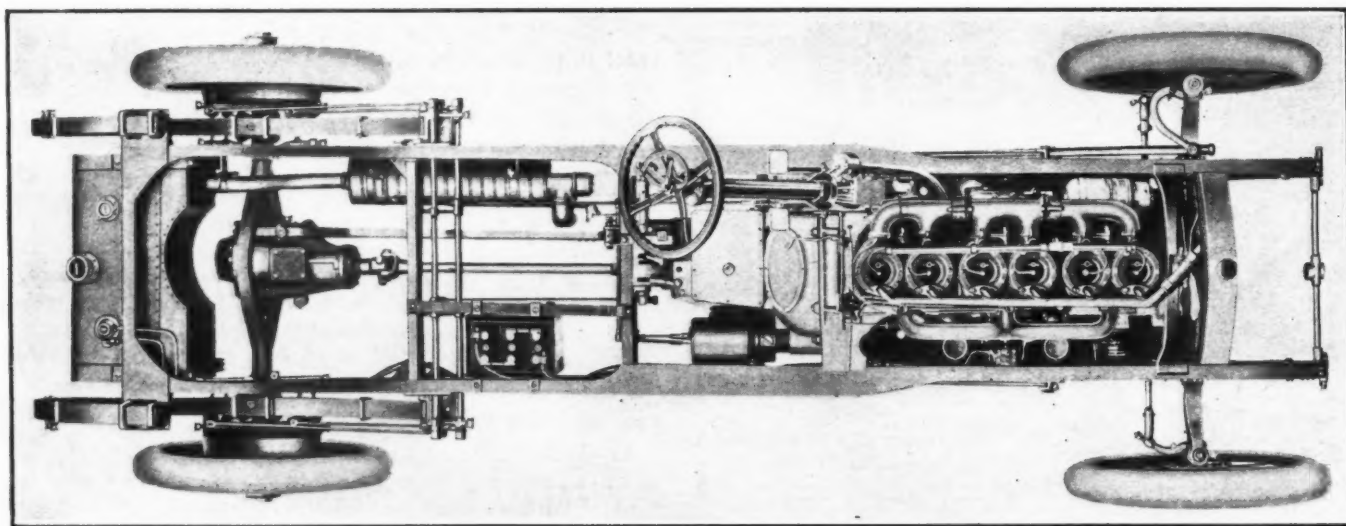
Connection between motor and gearset is obtained by a dry disk clutch. A large handhole is provided for the inspection and adjustment of this member.

The rear axle is a full floating design in which the housing is carried inside a diamond-shaped drop forging, two points of which form the ends of the axle housing and carry the springs, thus the member supporting the weight is one solid piece and the driving mechanism is merely carried in it. The torque reaction of the rear axle is taken up by a torque rod fastened to a cross-member of the frame. There is an inspection plate on the top of the axle housing and the rear of the housing is removable. Roller bearings are used throughout the rear axle, and front wheels.

Internal and external brakes act on the rear wheel drums.

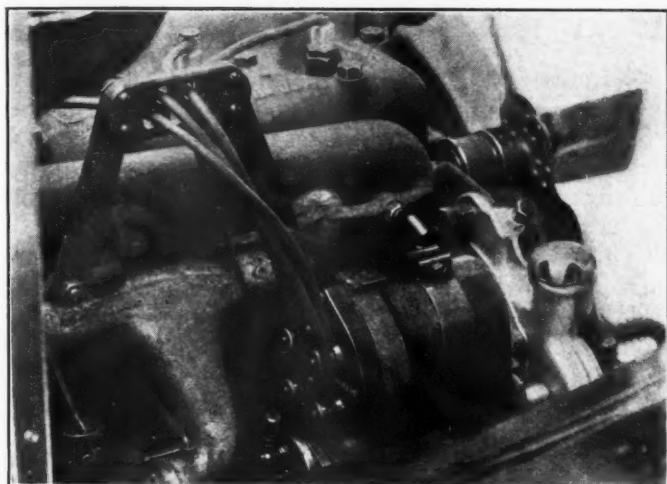
The channel frame is supported at the front by half-elliptic springs and at the rear by three-quarter springs.

The wheelbase of the four varies from 122 to 127 inches and of the six from 134 to 140 inches. On the former 36 by 4.5-inch tires are used all around, and on the latter, 37 by 5.



Plan view of Stearns six-cylinder chassis, showing unit power plant, left drive, rear axle construction, and tank in rear





New magneto installed, showing wiring support

## Eisemann Brings Out Ford Magneto

No Machine Work Required—  
New Gearcase Cover Supplied

**B**Y an ingenious system of replacing standard parts with special ones the Eisemann Magneto Co., Bush Terminal, Brooklyn, has evolved a method for attaching a standard Eisemann magneto to a Ford motor without the necessity for doing any machine work or other fitting. The parts are so marked that when put together on the motor in accordance with instructions, the magneto is properly timed, and it is not necessary to have an expert knowledge of magneto timing methods. It is pointed out by the manufacturers that the magneto and drive attachment can be installed by anyone in a few hours.

The outfit consists, in addition to the magneto, of a new gearcase cover to take the place of the Ford timing gear cover, magneto bracket which is cast integrally with the cover, driving gears, switch, special control rod, cable bracket and small accessory parts. The outfit is supplied for single or dual ignition, in which case a dash coil forms part of the equipment.

The magneto location is at the front of the motor on the right side and it is driven by a gear from the camshaft. In the installation of the Eisemann outfit the Ford timing gear cover is removed and discarded. The camshaft gear is removed and one of the dowel pins in the hub is driven out and replaced by a longer pin which forms part of the equipment; the pin removed is the one nearest the timing mark on the gear.

A spacing washer is slipped over the shaft and has a hole for the long dowel pin; then the Eisemann gear, which is of bronze, is slipped on the shaft; there is a hole in the hub of the gear for the dowel pin, and the arrangement results in the accurate location of the driving gear. A nut on the hub of the gear is tightened and holds the drive securely in place. In case it is necessary to remove the gear the nut acts as a puller, and makes the operation an easy one.

The Eisemann company also makes a dual ignition system in which the magneto is of the low-tension type and is used in connection with a battery and a step-up coil on the dash. The installation is not different in any way from that of the high-tension magneto except for the attachment of the coil, the battery which is carried under the seat, and three extra

wires. When the dual system is used a small mechanical vibrator makes it possible to start the motor on the ignition, provided there is gas in the cylinders. The vibrator is enclosed in the upper part of the switch casing and is turned by means of a thumb-button. With the dual system there is no difficulty in starting the motor on the magneto.

The price of the outfit with high-tension magneto is \$50 and of the dual system \$55. Every part that is required to make the change is included.

### Lighter Parts Increase Horsepower

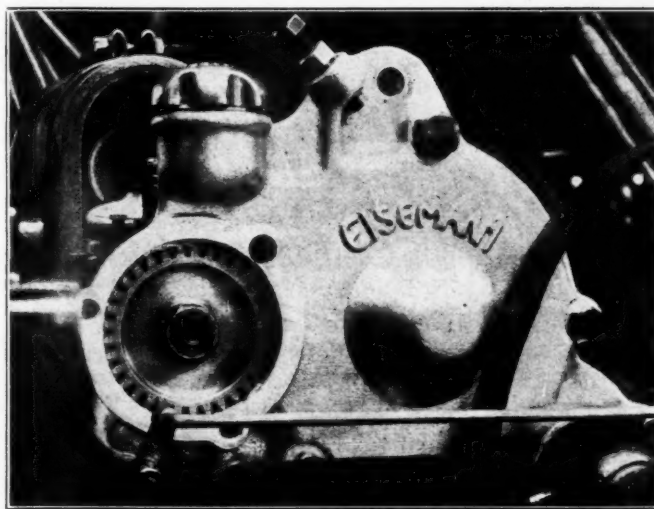
(Continued from page 864.)

have found that satisfactory results are given by lighter reciprocating parts in general have experimented recently to a large extent in steel and aluminum. Cast iron has its limitations in strength and therefore a material has been sought in which lightness can be gained without a sacrifice of strength. The same objection has been opposed to the steel piston as to the aluminum, that is, the higher co-efficient of expansion, and hence the necessity of leaving a large clearance which would tend to give a piston slap at low speeds or to seize at high speeds.

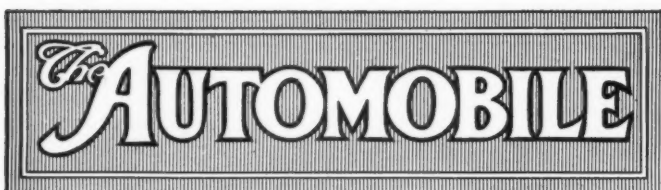
The Willys-Overland company has recently experimented in steel pistons in order to find something which would meet their views regarding lighter parts without sacrifice of strength. C. W. McKinley, engineer of the Willys-Overland company, states that, while the company is a firm believer in reducing the weights of pistons and connecting-rods as much as possible without impairing their strength, it has not had very favorable results with steel pistons, as it is necessary to allow more clearance with this type of piston than with the gray iron piston; consequently at medium motor speeds piston slap occurs to a considerable extent. At the same time, if the clearance is reduced to the amount used on gray iron pistons, the user is very apt to have the piston seize, should he indulge in driving at high speeds.

### Improvements Are Being Made

From what has been stated it must not be imagined that steel or aluminum pistons have been thrown in the discard. In fact, improvements in the manufacture of these two metals are being made so rapidly that as the experience of those experimenting with them increases, there seems to be but little doubt that their usage will grow. Some of the aluminum alloys, such as magnalium, for instance, have been extensively tried out and with no little success. With the magnalium a great advantage is secured through its high conductivity and its resultant capacity to carry off the heat from the piston head.



Front view of Eisemann magneto installed on Ford, showing the new gearcase cover in place



PUBLISHED WEEKLY

Vol. XXX

Thursday, April 23, 1914

No. 17

## THE CLASS JOURNAL COMPANY

H. M. Swetland, President  
 W. I. Ralph, Vice-President E. M. Corey, Treasurer  
 231-241 West 39th Street, New York City

## BRANCH OFFICES

Chicago—910 South Michigan Avenue Detroit—505 Free Press Building  
 Boston—1035 Old South Building Cleveland—516-517 Swetland Building

## EDITORIAL

David Beecroft, Directing Editor  
 Donald McLeod Lay J. Edward Schipper Sydney Oxberry  
 L. V. Spencer, Special Representative, Detroit

## ADVERTISING

F. B. Barnett, Cleveland C. H. Gurnett, Chicago  
 L. G. Vogel, Detroit F. J. Robinson, Chicago

Cable Address ----- Autoland, New York  
 Long Distance Telephone ----- 2046 Bryant, New York

## SUBSCRIPTION RATES

United States and Mexico ----- One Year, \$3.00  
 Other Countries in Postal Union, including Canada ----- One Year, 5.00  
 To Subscribers—Do not send money by ordinary mail. Remit by Draft,  
 Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.  
 The Automobile is a consolidation of The Automobile (monthly) and the Motor  
 Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903,  
 and the Automobile Magazine (monthly), July, 1907.

## The Early Tire Bird

**S**PRING and tire troubles are synonymous. The first days of country touring tell the story of roadside tire repairs, punctures, tires frozen to rims, rims frozen to wheels, blowouts, pinches and everything else in the tire-trouble category. Much is due to the winter garaging or storage. It is good policy to have all of the tires removed before the car is taken out. Take the casings off the rims, the tubes out of the casings and the rims off the wheels. The tubes will be found sticking to the casing, a fact which explains many pinches in early spring touring. Use gasoline in separating the tube. Clean out the casing well. Use new chalk. The rim will be rusted, the tire bead will be covered with rust. Clean both. Use graphite or other preparation on the rim. Do a general house-cleaning act. It may take one half-day. Have your tire man do it for you. It will prove worth while. You will save money by it.

Go further, and have all surface cuts in the tread of the casings filled with some of the many fillers suited for this work. If there is dirt in them be sure the cut is thoroughly cleaned and washed with gasoline. Then add the filler. It may be necessary to use a vulcanizer. This, too, will be worth while. These cuts let the water in, the water soon destroys fabric, rots it and then the way is paved for a speedy blowout, the ruin of your casing, the ruin of an inner tube. Be a stitch-in-time tire artist and save time, trouble and expense.

## Our Sixth City

**C**LEVELAND, which recently came into particular prominence by displacing Baltimore as the sixth city in America in population, and which was once the premier American city as an automobile center, but which position was lost to Detroit several years ago, is now making rapid gains.

Cleveland ranks high in the automobile field, not because of the number of concerns manufacturing gasoline or electric automobiles for pleasure and commercial uses, but rather because of the grand total it represents in the automobile field. This grand total is made up of car and truck makers, together with the many accessory and parts makers located in the city. The parts makers take a large place in the sum total of Cleveland, their lists including the names of some of the largest makers of frames, castings, forging, stamping and other parts, so essential in the make-up of a car.

Because of the wide nature of its production for the automobile trade, a Cleveland canvass of the present conditions of the motor industry can be accepted as conveying a fairly true estimate of the industry. Beginning with the concerns manufacturing passenger gasoline cars, practically all are unanimous in declaring that business during the first 3 months of the current year has not fallen below the corresponding months of a year ago. Some concerns doubled their business in these months, as compared with a year ago, and others showed substantial gains over 1913.

Cleveland has some of the largest producers of gasoline trucks in America and reports show that there has been excellent buying during the present year. A large percentage of sales consists of repeat orders from concerns operating trucks in a dozen or more cities. These repeat orders seem to come as replacements for horse systems, the horses being gradually eliminated and the motor taking their place. Many, in fact nearly all, of these repeat orders come without much solicitation and bear conclusive proof that many of our large industrial concerns are sold to the motor truck.

Cleveland makers of electrics report good business. The effect of the self-starter on gasoline cars coupled with the present avalanche of closed body types indicates that the small gasoline car is going to dispute the city field with the electric, and keen rivalry may be looked for. That the electric is not confined to a few of our cities but is being sold country-wide is shown by the statements from one concern that is now selling its passenger electrics in over 110 cities.

The awakening of the local electric power companies to the advisability of co-operating with makers of electrics and furnishing good business prices for electric current for charging vehicles, has greatly aided in stimulating the wider use of the electric. The eventual boundary is yet far off, as there are hundreds of cities in which the power companies are still asleep, in spite of the good efforts the Electric Vehicle Assn. of America is making to awaken them.



# Accident to Employee May Cost \$46,800

New Workmen's Compensation Law Taking the Place of Employers' Liability in New York Gives a Maximum Life Disability Award of Two-Thirds of Wage—Indemnity for Workmen in Every Accident—In Effect July 1

NEW YORK CITY, April 17—When the Workmen's Compensation Law, supplanting the Employers' Liability Law, goes into effect in New York State on July 1, the most favorable legislation for workers in any district in the world will be in force.

This was learned Wednesday night at the meeting of the Motor Truck Club of America at the Automobile Club of America headquarters, where Edson S. Lott, president of the United States Casualty Co. said:

"Under this new law the employer whose workmen are engaged in any of the so-called hazardous employments must pay something every time an employee receives a disabling injury, either in doctors' bills or compensation, or both."

Disability Salary of 66 2-3 per Cent.

In the case of some injuries, Mr. Lott said that such payments on the part of the employer "might continue for fifty or sixty years" and would be on the basis of two-thirds of the wages the workman was receiving at the time of the accident.

He said that in case of the accidental death of an employee, the employer might have to pay compensation, amounting to two-thirds of the wages earned by the deceased employee while living, to "those who depended, in whole or in part, on such workman for support or financial assistance, and the payment of this compensation may continue for a long term of years."

## Employers' Possible Responsibility

Mr. Lott cited a supposititious case, as follows:

A workman is killed, aged 22 years, wages \$20 per week:

	ANNUAL COMPENSATION	DURATION IN YEARS	TOTAL PAYMENTS
Wife, aged 22 years.....	\$300	50	\$15,000
Child, aged 1 month.....	100	18	1,800
Child, aged 2 years.....	100	16	1,600
Mother, aged 45 years.....	150	25	3,750

Cost to the employer for one accident..... \$22,150

Mr. Lott quoted from a pamphlet written by P. Tecumseh Sherman, as follows:

*"For permanent total disability every workman who is in receipt of wages at \$22.50 per week or over, when injured, will be entitled to the maximum weekly payment of \$15, or annual pension of \$780, for life. What will be the average cost of such pensions is an actuarial question. But foreign experience indicates that those drawing permanent disability pensions have a surprisingly long life expectancy. Consequently such pensions may frequently run for 60 years or more, so that an aggregate of \$46,800 in a single case may not be unusual."*

As respects insurance under the new law, it appears that employers may insure in the state fund, created by the act and managed by the State Workmen's Compensation Commission recently appointed by Governor Glynn, in a stock liability insurance company, in a mutual insurance company, or, under certain circumstances, employers may carry their own insurance. Of this Mr. Lott said:

"While I believe that stock insurance offers the best and safest insurance for employers under the New York Workmen's Compensation Law, yet I think that our lawmakers were wise in providing various means of insurance—as against a monopoly of any one kind—for by so providing each form of insurance must compete against all other forms.

Mr. Lott claimed that our compensation law is the most drastic of its kind in the world, and predicted that insurance rates in connection therewith will be "from two to five times higher than the present rates for employers' liability insurance."

## How Motor Trade Is Affected

He said that, as respects the automobile truck trade, the following employments came within the law: The operation, including construction and repair, of machine shops; the loading or unloading of cargoes of products or materials, or

moving or handling the same on any dock, platform or place, or in any warehouse or other place of storage; operation of electric light lines, electric power lines, dynamos, or appliances, and power transmission lines; manufacture of traction engines, wagons, carriages, sleighs, vehicles, automobiles, motor trucks, tires; operation, otherwise than on tracks, on streets, highways, or elsewhere on cars, trucks, wagons or other vehicles, and rollers and engines, propelled by steam, gas, gasoline, electric, mechanical or other power or drawn by horses or mules; carpentry; painting. Mr. Lott stated that there were a number of employments on the border line of coverage under the law, which the courts must pass upon before it would be definitely known whether or not they were covered.

Mr. Lott pointed out that employers' laws have been under change for twenty-five years, and always in favor of the injured workman. He stated that even after many of the old legal defenses had been taken away from the employer, the records showed that only one injured workman out of each seven and one-half, on an average, received anything from his employer or the insurance company insuring the employer by way of damages for injuries sustained, because the employer was legally to blame for only one of each seven and one-half accidents.

There also was a paper read by Edmund Ely, Superintendent Aetna Insurance Co., on the subject of automobile insurance. Mr. Ely stated that more people take out fire insurance in the automobile department than any other kind though the liability side is fast growing in volume of business.

## New Insurance Rates Are Lower

NEW YORK CITY, April 21.—The following revised schedule of rates for non-valued form of policy has been issued by the Automobile Conference. These apply in New England, the Middle Department and the Metropolitan District, and exclude theft and reinstatement clauses. They are effective from April 20:

### GASOLINE PLEASURE CARS

Cars of this and next year's models:

Insured for not less than 80 per cent. of list price, 1½ per cent.

Cars of last year's models:

Listing \$3,500 and over, 1½ per cent.

Listing \$1,500 to \$3,499, insured for not exceeding 80 per cent. of list price, 1¾ per cent.

Listing under \$1,500, insured for not exceeding 60 per cent. of list price, 2 per cent.

Cars of year before last models:

Listing \$3,500 and over, 2 per cent.

Listing \$1,500 to \$3,499, insured for not exceeding 60 per cent. of list price, 2½ per cent.

Listing under \$1,500, insured for not exceeding 50 per cent. of list price, 2½ per cent.

Cars of Models 3 years old:

Listing \$3,500 and over 3 per cent.

Listing \$1,500 to \$3,499, insured for not exceeding 40 per cent. of list price, 3 per cent.

Listing under \$1,500, insured for not exceeding 40 per cent. of list price, 3½ per cent.

Four-year-old models and older, minimum rate, 4½ per cent. of list price.

Electric cars, all models, 1¼ per cent.

Commercial trucks of not less than 1 ton capacity (this and next year's models) 1½ per cent.

Cars rented, leased or used for carrying passengers for compensation, charge 1 per cent. in addition to the above rates.

Minimum premium, \$5.

## To Discuss Russia as Export Field

NEW YORK CITY, April 21.—The exportation of passenger automobiles will be discussed at a meeting on April 23 of the Russian trade division of the National Assn. of Manufacturers, jointly with the commercial attaches of the Russian Imperial Embassy, at Washington, D. C., C. J. Medzikhovsky. This is the second of a newly inaugurated series of open meetings at the offices of the National Assn. of Manufacturers, 30 Church street. The meeting will be called at 3.30 p. m. Conditions governing the sale of automobiles in Russia and also the principal lines represented, will be described.

# Industry Flourishing in Cleveland

## White Working Overtime—

### Winton Production 1,500 Cars—

### Chandler Has Made 1,200 Cars

CLEVELAND, O., April 18—This city, which recently obtained the distinction of becoming the sixth city in the land so far as population is concerned, is rapidly developing as an automobile center. At one time Cleveland was the first automobile city in America, but Detroit robbed it of this distinction and today the optimist looks forward to the not distant future when Cleveland may again occupy the distinction of being the greatest automobile city. This distinction may not rest on car production alone, but rather on the sum total of cars, accessories and parts.

During the last days THE AUTOMOBILE representative has made a trip through many of the factories for the purpose of finding out exactly to what extent the industry has suffered due to the strained financial conditions of the past year, and also because of the general unrest throughout the country. The sum total of the investigation has proven that the first quarter of this year, namely January, February and March, have, with practically all the companies, shown an increased business over corresponding months of a year ago. Several of the plants say that they have not been held back a single week due to matters financial. Some factories show very large increases in business over a year ago, others are holding their own and in only one or two cases are there reports of their business falling behind that of a year ago.

The present review does not represent the entire city, and those concerns not reported on will be taken in a later issue.

#### White Plant Working Overtime

The White Co. has had a particularly good year in both its gasoline trucks and passenger cars and for nearly the entire year has been operating one-half of its departments 1 hour overtime each day. The company is still continuing this schedule and reports being behind deliveries in passenger cars. Since January 1 the market for 3- and 5-ton trucks has shown a large increase, particularly the larger size. These sales coming from all parts of the country prove that financial conditions are not so uncertain as they have been pictured. During this period some of our largest coal concerns in the country that have been holding against motor trucks have placed their first orders. There has been a very general increase in the number of repeat orders which have been coming in for six to ten trucks, from concerns operating fleets. Recent orders for taxicabs include one of twenty-five from the Terminal Taxicab Co., Washington, D. C., which will give this concern sixty. The Towne Taxicab Co., of New York, has ordered fourteen additional, giving it a total of forty. A recent interesting sale is that to the Cleveland Railroad Co., which has purchased three trucks on which they will put omnibus bodies and use them as extensions to the present Cleveland street car service. The company reports increased business in the use of sight-seeing vehicles for national parks, etc.

#### Winton Business Prosperous

The Winton company, in spite of the general unsettled financial conditions of the country, has not been held back a single week, in production or deliveries and is practically through with its manufacture of 1,500 cars for the current season. It has disposed of this output through its twenty branch houses which have taken directly 80 per cent. of the cars manufactured, and its sub-dealers. This company occupies an enviable position in the motor field in that it has not increased its production, having manufactured approximately this number of vehicles for several years. In fact, it has not been necessary to make any factory additions in the last 4 years. The company has worked with full force and on a full time schedule beginning with last July right up to the present, and expects to so continue except for a short shut down to take stock.

The Stearns company, which is at present announcing that it will continue its present six-cylinder model with some slight changes for the 1915 season, reports an increase of business for January, February and March of from 20 to 25 per cent. over the business of October, November and December, and

also that the business of this year shows a substantial improvement over the three corresponding months of 1913. During the present year Boston has led in increased business over a year ago which is particularly encouraging in view of the bad financial conditions in New England, owing to New Haven road finances as well as the new tariff and labor troubles. California shows an increase in business. Ninety-two per cent. of Stearns sales are made in the twenty-five largest population centers of the country. The company has experienced an increased business in closed cars which is 33 per cent. ahead of last year. The field of selling the closed types is increasing from year to year. Up to the present the output has been evenly distributed between four-cylinder and six-cylinder models. The factory has increased in area during the past year.

The Chandler company, which started in its new Cleveland factory last August, has already produced approximately 1,200 cars and is working on a schedule of twelve to fifteen per day at present. The company in addition to completing its factory and getting installed in same has built up a selling organization of 175 agencies, or thereabouts during the past season.

#### Electrics Selling Better

The Rauch & Lang Carriage Co. reports a steady condition in the electric passenger car field. There is an increase in demand for the electric vehicle with control from either front or rear seats which points to the fact that these vehicles are being more used for all family uses. The sale of electrics is gradually increasing, the company now marketing its cars in not fewer than 110 different cities. The Middle West from Buffalo to Kansas City is the best field for electrics. Business in California is improving and New England business centering around Boston has opened up somewhat during the past year. The company reports holding business for January, February and March up to the standard of a year ago.

The Perfection Spring Co., which devotes its entire efforts to manufacturing springs for all forms of passenger and commercial vehicles, has been working to capacity since early last fall and is at present installing new units in its factory for the manufacture of springs which will practically double its present capacity. The company has been during the past year developing new machinery which will greatly increase its capacity for spring manufacture and has designed and already installed machines for spring testing which greatly reduce the time required for this work. The physical and chemical laboratory of this company for testing materials for springs, as well as raw stock, is most complete and typifies the manner in which this company is endeavoring to manufacture springs on an engineering basis. The company is located in an up-to-date factory which is laid out on a motion-study and production basis.

#### Wide Scope of Activities

The Ferro Foundry and Machine Co., while not closely identified with the automobile industry by many owners, is nevertheless a close factor in that it furnishes cylinder castings and other castings in great quantities to manufacturers. At present it is producing approximately 1,200 castings per day to the Overland company, and nearly as many to other concerns. Its line of castings includes motor parts, gearboxes flywheels, etc. Two-thirds of the plant is given over to the production of motor car castings and the remainder to marine motor work. The factory has a capacity for 1,200 people and has approximately 900 on the present pay-roll.

The K-W Ignition Co. is one of the Cleveland concerns that has made rapid progress in the last few years, and is now located in its new plant where it is specializing on various accessories for Ford cars as well as producing its line of K-W magnetos. The company has recently occupied one of two new additions to its factory and expects to break ground in 60 days for two additional buildings which, when completed, will add 50 per cent. to its manufacturing area. During the first 3 months of this year the company's business has increased three-fold over a year ago, and extra workmen are being added all the time.

The Gabriel Horn Mfg. Co., producing the Gabriel snubber, is manufacturing 150 sets of these a day and reports a 30 per cent. increase for January over the previous year, 40 per cent. increase for February, and approximately 100 per cent. increase for March over March of a year ago. This concern sells approximately two-thirds of its output through dealers, and has it as standard equipment on the White, Stearns, Peerless, Lozier, Oldsmobile and some others. On March 10 of this year Claude H. Foster, president of the concern, was granted patent No. 1,080,028, covering the present form of Gabriel snubber.



# Chicago Dealers Losing on Repairs

## Considering Raise of Rates—

## Planning Employment Bureau—To Set Price of Second Hand Cars

CHICAGO, April 18—How to make the repair shop pay or at least break even is a question which is worrying local dealers and to solve this problem the Chicago Automobile Trade Association is delving into the proposition in a systematic manner which promises to produce results. As it looks now, this most likely will mean an increase in the charge for this sort of service from 75 cents an hour, the present rate, to 90 or 95 cents. Even at the latter figures some dealers claim that little profit can be made.

Whether this increase will drive the owners to the outlying garages and thus leave the shops along the row with idle time on their hands is one of the problems. Some of them say they would be willing to have the small garages take the business only for the demand made by the buyer that he get service with his car.

The matter of shop rates, the used car and an employment bureau came up at this week's meeting of the trade association and while no definite action has been taken as to raising shop rates, still it looks now as if there will be such an increase.

### Employment Bureau on E. V. A. Lines

The creation of an employment bureau was the next subject taken up and it was decided to formulate plans for conducting such a business on the same general lines as the agency conducted by the Electric Vehicle Association of Chicago. This agency operates in general as follows: Every man inquiring of a member for employment is referred to the bureau and at that office he is required to fill out a blank giving his name, previous employers and other information and pay a fee of \$2. Application has been made for a license to operate an employment agency.

### To Set Prices of Used Cars

Under the new used-car régime all used cars handled by the members will be registered with the association, these registrations being filed quarterly, and the average price of every model of a certain make determined. This plan takes into consideration the condition of the car whether it is sold as received, partially overhauled or rebuilt. The current price of all makes of cars will be issued to the members and they will then be in a position to buy and sell used cars at a standard price which will not vary along the row. In this way the buyer will get the same answer as to price from every dealer and the person who turns in a car as part payment on a new one will not get more than the current price for that particular car. Outside dealers wishing to obtain the current rates will be required to pay \$25.

### S. A. E. Research Division Meets

NEW YORK CITY, April 22—At the meeting of the Research Division of the Society of Automobile Engineers held at the headquarters in this city a program of work was laid out in connection with the study of the tap and die situation which this committee has undertaken. The members of the division present at this meeting were David L. Gallup, chairman, C. B. Veal, James A. Moyer and H. F. Thompson.

It has been decided by the division that tests on existing sizes of taps and dies will be started. The tap and die manufacturers differ at present as to the amount of thread it is necessary to cut, that is, particularly in the percentage of depth. One manufacturer claims for instance that 75 per cent. is adequate. What the division intends to do is to make tests with different materials starting on aluminum to a 50, 75 and 90 per cent. depth of thread in both U. S. and S. A. E. standards.

At the division meeting which offered an excellent opportunity for these authorities to get together the question of student members of the S. A. E. was discussed. All the members of the division present were interested in the student membership, particularly Professors Gallup, Veal and

Moyer who are members of the faculty respectively of Rochester Polytechnic Institute, Purdue University and Pennsylvania State College. Student membership was favored but only under the condition that it be regulated as to the length of time and that also to an age limit.

The electrical equipment division meeting has been postponed from May 5 to May 19. The Ball and Roller Division which has for its present object the reduction of roller bearing sizes to one-quarter the present number, will meet on May 12. The motor testing division on May 14. It is probable that there will be from six to a dozen division meetings before the regular standards committee meeting in June. Another iron and steel meeting will be held.

The Electrical Vehicle Division is having some difficulty in getting together owing to the fact that its members are widely scattered. They are now in the process of electing a chairman after which a time and place of meeting will be selected.

NEW YORK CITY, April 22—Finley R. Porter, designer of the Mercer Grand Prix winner, will read a paper on racing and its effect on manufacture before the Metropolitan Section of the Society of Automobile Engineers to be held at the Automobile Club of America on April 30 at 8 p. m. Through arrangements made with the Automobile Club there will also be an exhibition of moving pictures of the recent racing events at Santa Monica. At the section meeting arrangements will be made to hold a May Festival.

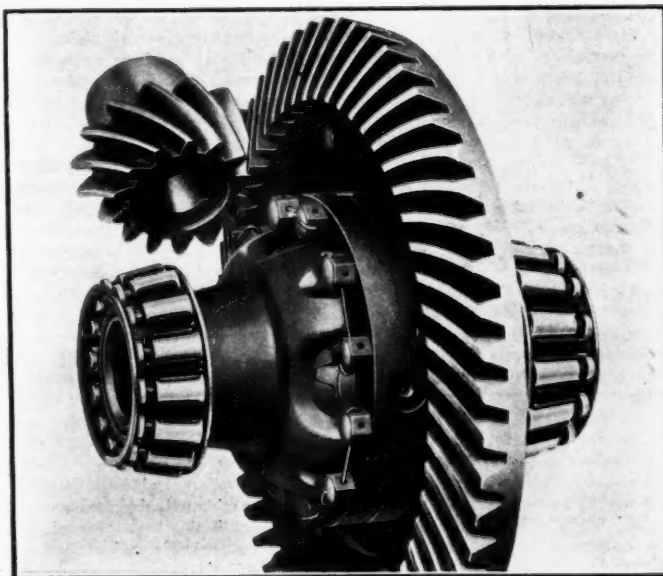
### Timken Has New Helical Bevel Gear

DETROIT, MICH., April 17—After several months of development and testing, the Timken-Detroit Axle Co. has placed upon the market a type of bevel gearing for rear axles which has helically cut teeth instead of the ordinary straight variety. The illustration herewith shows the appearance of a pinion and gear so cut together with the mounting and so on.

It has taken months of effort to evolve a method and a machine which will produce the curved teeth on a practical commercial basis, according to the Timken company, and just as rapidly as the special machines for cutting them can be built they are being installed in the Detroit plant.

The advantages of helically cut teeth over the straight teeth have already been explained, but it might be well to point out that the latter teeth go in and out of mesh one at a time along the entire tooth length. Thus each tooth carries all of the load at each revolution of gear or pinion. But with the new cut, at least two teeth are in partial mesh at all times. There is a rolling action, one tooth meshing with its mate on the other member at one end only, and as the motion of the gears continues the point of contact between the two given teeth moves gradually to the other end. This rolling action insures silence, due to this gradual entering and leaving of mesh, and it has been found that even when the gears are worn they work equally well.

Efficiency tests have shown that the helically cut gearing is just as efficient as the straight bevel types now in common use.



New Timken bevel gear drive with helical teeth

## Prest-O-Lite Strong in Law Though Losing in New York

Chicago Federal Court Decision Denying Searchlight Co. Relief Said to Outrank Dealers' Victory

NEW YORK CITY, April 21—The Prest-O-Lite Co. lost in two minor tank-refilling cases in the Appellate Division of the Supreme Court of New York this week, in which it invoked the New York Business Law against two dealers in Searchlight gas.

This defeat is more than outweighed, it is thought, by the decision in the United States Court of Appeals in Chicago on April 14 when the property right of the Prest-O-Lite Co.—respondent in the action—in its trade-mark and system of doing business was approved and the Searchlight Co. was forbidden the right to refill Prest-O-Lite tanks without entirely altering the tanks.

The latter decision was reported briefly in THE AUTOMOBILE for April 16.

The gist of the New York decision is that the Prest-O-Lite "monopoly" expired with the Prest-O-Lite patent in 1910 and that the right "now is open to all the world to adopt the plaintiff's style and form of tank and formula for preparing, storing and selling acetylene."

The Appellate Division admits, however, that the plaintiff, the Prest-O-Lite Co., is entitled to "injunctive relief" against unfair competition, but decrees that the Court was not competent to judge that phase.

Smith & Haines and the Brickner Auto Supply Co., two Searchlight dealers, were the defendants. They had lost in the lower courts. The case was reversed with costs. Appeal to the New York Court of Appeals will be taken, it is said.

In the Chicago decision, that fixes the precedent, it is said:

For use on automobiles at night appellee Prest-O-Lite many years ago began to sell steel bottles or tanks, equipped with regulatory outlet-valves, and containing acetylene gas dissolved in acetone. Empty bottles were never sold by appellee to be filled and used by purchaser, like thermos bottles or lamps are filled and used. Appellee bought steel bottles from steel makers, just as manufacturing chemists buy glass bottles from glass makers, and appellee's knowledge and skill, like chemists, were employed in preparing and preserving the contents. What was offered to users was a unitary gas-package. Upon the package was displayed the trade-mark, Prest-O-Lite. And in accepting packages so marked hundreds of thousands of users came to expect and rely on appellee's skill in furnishing them a certain high quality and a reliable quantity of acetylene gas.

"Appellant's acts of gathering up empty bottles so marked, filling them with its own mixture, and palming them off upon unsuspecting automobilists as appellee's genuine gas-packages, were the plainest sort of infringement."

"Against the part of the decree that ends such piracy there is virtually no defense beyond certain collateral contentions that will be noticed after the consideration of the real merits of the controversy between these parties has been finished."

"But appellee has property rights beyond its strict trade-mark rights. A consumer of ordinary articles of trade goes to his local merchant for a fresh supply or has it sent to his home. A Chicago automobilist, starting for seashore or mountains and extending his travel into the night, may exhaust his supply of acetylene gas hundreds of miles from home. With such contingencies in mind, appellee established a system of service."

"By an expenditure of over \$1,000,000 appellee enabled more than 600,000 users of Prest-O-Lite to get a new supply in every city and town and nearly in every village in our land. For an original Prest-O-Lite gas-package the customer paid \$25; for each subsequent package, \$2.50 and the surrender of the empty steel bottle."

"To serve 600,000 customers it was necessary for appellee to keep 675,000 bottles in circulation, empties coming in and charged ones going out. If an empty was unfit for further service, a new bottle was supplied as part of the upkeep cost of the system. Before an empty was permitted to go out again into the stream of service, valves had to be repaired or replaced, acetone replenished or supplied anew, and fresh acetylene was put into the solvent. The ultimate fact of importance is that in the automobile world Prest-O-Lite came to stand not only for the physical article, but also for the incorporeal right to serve and be served."

"Appellant, of course, was at liberty to establish and conduct an independent and competitive system of service. If appellant had really desired to enter a race of competition on the merits, it would undoubtedly have refrained from feeding on appellee's service and would also have adopted, on the trade-mark feature of the case, distinctive gas packages and unambiguous labels. Its fraudulent intent to prey on appellee's system of service is abundantly proven. One item will sufficiently illustrate: In letters to

seduce Prest-O-Lite dealers, appellant suggested that there is 'a great deal more money in it for a Searchlight dealer than any other, as he has the advantage of having two fields to work in.' And acts accorded with intent."

"This brings us to the biting part of the decree. Appellant is enjoined from recharging Prest-O-Lite tanks 'without completely removing and permanently obliterating from the said tanks and said trade mark, Prest-O-Lite.' Appellee stamps the mark into the metal, so that appellant finds great difficulty in obliterating the mark completely and permanently without danger of making the tank unusable."

"What appellant is principally fighting for is a modification that will permit it to recharge Prest-O-Lite tanks and supply them to automobilists without obliterating appellee's marks, but simply by covering them over with its own labels. Appellant has been pasting on Prest-O-Lite tanks a paper label announcing that 'This refilled tank contains acetylene gas made by the Searchlight Gas Co.'"

"This label, the record proves, has not been effective to prevent deception of customers demanding and expecting to receive genuine Prest-O-Lite gas packages. The wording is ambiguous; the paster may come off; and if it does not, inasmuch as exchanges are frequently made at night without the driver's getting out of the car, the deceived is likely to be miles away from the deceiver before noticing the paster. The decree is affirmed."

### Newton Makers File Brief on Appeal

NEW YORK CITY, April 21—The Automobile Supply Mfg. Co. has filed a brief on its appeal from the decision given the Klaxon company in the U. S. Court in Brooklyn, in January. It has been filed in the U. S. Circuit Court of Appeals for the Second Circuit, sitting in this city, against the Lovell-McConnell Mfg. Co., the Klaxon maker.

The allegation that "the patent specifies one thing and the horn does another," may be summed up as the main contention. The usual assignment of errors and reproductions of Miller Reese Hutchison's patents are contained in the brief, containing 119 pages.

It is claimed that the patent covers a diaphragm which is operated by a toothed wheel, the wheel not pushing the diaphragm from it until it has swung entirely back from the push given it by the tooth with which it was last struck, while the horns themselves, Klaxon or Newton, hit the diaphragm before it has come entirely back. Were the diaphragm, it is argued, allowed to swing entirely back through a period of oscillation before being again pushed forward the result would be a sweet musical sound, while the fact that in actual use the tooth of the wheel and the nub on the diaphragm meet in head-on collision causes a harsh and raucous note. Argument on the case will come up on May 5 and the result will probably be known before the summer is over.

### Suit to Settle Stewart-Warner Affairs

CHICAGO, ILL., April 21—*Special Telegram*—Legal proceedings involving \$150,000 and growing out of the coalition of the Stewart and Warner interests at the filing with the Circuit Court of Cook County, a praecipe by M. H. Whitney for use of Stewart-Warner Corp., against C. H. Warner, A. P. Warner, James Barclay and Addie C. Irish. The filing of the praecipe calls for an answer from the defendants. It appears that the defendants were indebted to M. H. Whitney who transferred the account to the Stewart-Warner Speedometer Corp. No details have come forward other than the statement from the Stewart-Warner Speedometer Corp., that this is a friendly suit involving a final settlement of certain matters which have not matured, covered by the original contract under which the Warner Instrument Co. sold out to the Stewart-Warner Speedometer Corp.

### Ohio Dealers Fight Fees

COLUMBUS, O.—On the ground that the increase of the fees for registering manufacturers and dealers from \$10 to \$20 was unreasonable, Ohio auto dealers have started a movement to have the fees reduced to the figures which prevailed in 1913. It is argued that the doubling of the fees is particularly burdensome to the small dealers in the state.

### Sues on Tire-Making Patents

NEW YORK CITY, April 22—The status of the tire manufacturing trade as regards patents for tire making machinery will be considerably clarified when decision is made in the suit, argued yesterday in Newark, N. J., between the Goodyear Tire & Rubber Co., Akron, O., and the Ajax-Grieb Rubber Co., New York City. Goodyear filed this suit in 1910, charging infringement of patent No. 865,064, granted September 3, 1907, and covering a collapsible core.

A similar action has been argued in the United States District Court in Boston; the defendant is the Hood Rubber Co. and decision is being awaited.



Adding to the involved state of affairs, Frank A. Seiberling, president of the Goodyear company, has instituted suit in the Federal court in Trenton against the John E. Thropp's Sons Co., Trenton, N. J., on patents No. 762,561, granted June 14, 1904, to W. S. Stevens and No. 941,962, granted November 30, 1909, to W. C. State, both covering shoe making machinery.

There also is pending in the United States District Court in Trenton a suit brought by the De Laski & Thropp Circular Woven Tire Co., Trenton, against William R. Thropp & Sons Co., Trenton, for infringement of patent No. 1,011,450, granted December 12, 1911, to A. De Laski and P. D. Thropp and covering a tire wrapping machine.

In addition there has been pending in the United States Patent Office for several years an interference between, actually, the B. F. Goodrich Co. and the De Laski & Thropp Company on a patent for a bead placing ring. De Laski & Thropp and the John E. Thropp's Sons Co. also are pressing a suit in the Federal Court in New York City against the United States Tire Co. on patent No. 822,561, granted June 5, 1906, and covering a "wrapped tread" tire mold. A similar suit was brought against the Fisk Rubber Co. several years ago, but the Thropp's were beaten; they, however, decline to admit defeat and the whole mass of litigation has grown up, the settlement of which will greatly clarify the situation.

### Zenith Accepts Stromberg Suit Challenge

DETROIT, MICH., April 20—The Zenith Carburetor Co. is today in receipt of a communication from the Stromberg Motor Devices Co., Chicago, in which it is stated that the latter concern will accept the Zenith challenge to sue the Zenith company directly for alleged infringement of the Richard and Ahara patents owned by Stromberg. V. R. Heftler, president of the Zenith company, states that, although out of its district, his concern will submit to the trial of the case under the jurisdiction of the Chicago courts as stipulated by Stromberg.

The Stromberg company recently won a suit against the J. A. Bender Co., Chicago agent for Keeton cars, which carried Zenith carburetors, but inasmuch as this suit was not brought directly against the manufacturer, a direct fight is now to be staged.

### Auto Parts Co. Sues for Infringement

NEW YORK CITY, April 17.—Thomas F. Wilson, doing business as the Auto Parts Co., has brought suit in the U. S. District Court, Southern District of New York, against Charles Weiland, Inc., charging infringement of patent No. 976,274, which covers improvements in caps for renewing the worn ends of engine valve stems.

The plaintiff prays for an accounting and damages, a perpetual injunction and a preliminary injunction. *Præcipe* for subpoena has been filed.

The patent in suit was granted to James A. McHardy, Providence, R. I., November 22, 1910. Mr. McHardy assigned one-half interest in the patent to Edward M. Johnson, also of Providence, some time later. On April 5, 1911, the entire ownership of the patent was transferred to the plaintiff, who alleges that his business has been appreciably injured by the infringement of his patent by the defendant.

### Lincoln Highway in Patent Dispute

WASHINGTON, D. C., April 21—*Special Telegram*—Claiming that Commissioner of Patents Ewing abused his discretion in refusing permission to register the label Lincoln Highway and should be compelled to do so, the Lincoln Highway Assn., of Detroit, today applied to the district supreme court for a mandamus. Justice Barnard cited the commissioner to show cause May 1 why the writ of mandamus should not be issued against him.

The petitioner says the refusal of the patent office is based on a ruling that a highway is not an article of manufacture and the petitioners are not entitled to have the label registered. The corporation contends that a highway is a road made or manufactured by the work of man and that the ruling is not based on an exercise of discretion to determine any open question of fact, but is mere arbitrary dictum about a fact apparent on the face of the record and is therefore an abuse of discretion.

DETROIT, MICH., April 20—The Studebaker Corp. has appointed L. J. Ollier as sales manager and R. T. Hodgkins as assistant sales manager. Mr. Ollier has been for several years the manager of the branch in Los Angeles. Mr. Hodgkins comes from the branch in New York City of which he has been head.

## 159 State Measures Mashed Under A. A. A. Steam Roller

Only 23 New Motor Laws Pass in Ten Legislatures in 1914 Sessions—None Are Objectionable

NEW YORK CITY, April 20—Out of 182 measures affecting the motor car owner, introduced in 1914 sessions of ten state legislatures, 159 whispered faintly for help and died.

These legislative mortality statistics have just been compiled by the American Automobile Assn., which reports that the twenty-three bills that became laws have few objectionable features. This is accepted as a triumph for organized motoring.

Of ten legislatures convened, eight have adjourned. These are New York, New Jersey, Maryland, South Carolina, Virginia, Ohio, Kentucky and Mississippi. The Massachusetts session will continue another month or two and Rhode Island one month more. The only other regular sessions will be in Georgia, to convene June 27, and in Louisiana, to convene May 11.

Record of bills up to the middle of April is as follows:

State	Number of Bills Introduced		Bills Passed	Bills Signed	Bills Vetoed
	Senate	House			
Kentucky	5	9	1	1	0
Maryland	6	16	3	3	0
Massachusetts	6	42	4	4	0
Mississippi	3	4	2	2	0
New Jersey	9	15	4	3	1
New York	15	18	3	2	1
Ohio	0	0	1	1	0
Rhode Island	5	6	3	2	0
South Carolina	2	5	2	2	0
Virginia	8	8	4	3	1
	59	123	27	23	3

No drastic measure was enacted in any state, but a number of bills approved by automobilists passed. Massachusetts, New York and Rhode Island adopted laws requiring lights on all vehicles at night.

Of fourteen bills in Kentucky, some very bad, only one got through. It is a general measure which, as amended, fixes registration fees for motorcycles at \$5, cars of 25 horsepower and less, \$6; of 25 to 50 horsepower, \$11, and of more than 50 horsepower, \$20.

In Maryland the only important new law regulates speed of motor vehicles, prohibiting speed exceeding 35 miles an hour, and limits trucks weighing 4 to 8 tons, with load, to 15 miles an hour, those weighing more than 8 tons to 12 miles and traction engines to 6 miles. It limits widths to 90 inches, gross weight to 14 tons, and weight per inch of tire to 800 pounds.

New laws in Massachusetts prohibit use of muffler cut-outs, relate to garages in Boston and grant privileges to non-resident motorists. Forty-eight bills were introduced.

New York passed a bill making it a misdemeanor to violate traffic rules in New York City, but a bill to include motorcycles in the motor vehicle law, which passed both houses, was vetoed April 13.

Only one bill of general importance got through in New Jersey. It authorizes park boards to limit the speed of motor vehicles and even to exclude them from park drives. The administration measures to exempt motor vehicles from personal property tax and increase registration fees were defeated. A bill authorizing the commissioner of motor vehicles to increase the number of special inspectors to thirty and to appoint men from other state departments upon request, passed both houses, but was not approved.

An extraordinary session of the Ohio legislature passed a general license bill to take the place of the law of last year that was declared unconstitutional. It provides a fee of \$2 for motorcycles, \$3 for electric vehicles, \$5 for all other motor vehicles and \$20 for dealers' licenses. Chauffeurs must be examined and pay \$1 for registration.

Mississippi also enacted a new law for the one declared unconstitutional. It is called a Privilege Tax act and fixes the rates at which motor vehicles are permitted to use the roads as follows: Motorcycles, \$2.40; electric vehicles, \$4.80; commercial vehicles up to 4,400 pounds capacity, \$8.40, and exceeding this capacity, \$16.80, all other motor vehicles, 36 cents per horsepower. The funds go for road improvement and repair. A flat fee of \$2 is required for registration and number tag.

Only one bill of more than local interest was enacted in Virginia. It prohibits driving a truck, tractor or traction engine fitted with cleats or lugs that will cause injury to the road over any turnpike that has been treated with bitumen or other binder.

Three other Virginia laws permit local authorities in Accomac, King William, and Spotsylvania counties to levy special license taxes to provide funds for construction and maintenance of roads in these mountainous regions.

## Orders Inundate Packard Co. —Plant Pushed by 2,014 Sales

Seven Months Period, Beginning Last September, Exceeds Record by 132 Orders—1913 by 422

**D**ETROIT, MICH., April 17.—The first automobile manufacturer in the country to declare a shortage of cars for this season is the Packard Motor Car Co. During the first 7 months of that company's fiscal year, starting last September, the total sales for motor carriages have been 2,014. For the corresponding period of the 1910 season, the Packard company's previous banner year, 1,882 cars were sold.

President Joy states: "The company's allotted product for the year will be 500 cars short of market requirements. This year's business exceeds that of a corresponding period of last year by 422 cars. It is greater than the company's banner year by 132 cars.

"The largest week in the company's history closed April 11 with 160 sales. On April 8, we received a total of eighty-three orders from our dealers, each one representing a sale to a customer."

### New York Dealers' Demonstration Postponed

**NEW YORK CITY**, April 20—Owing to lack of entries the 2-day Business Demonstration which was to have been started by the New York Motor Dealers' Contest Association on Thursday, April 23, has been postponed for 30 days. Although the representatives of 9 different makes of cars signified their intention of taking part in the demonstration, at a meeting which was held on Friday last, it was found impossible subsequently to obtain entries from six more thus bringing the total up to fifteen makes of cars which had been set as the minimum number necessary to the success of the demonstration.

### Philp to Market Dodge \$800 Car

**DETROIT, MICH.**, April 20—The organization which is to market the \$800 car which the Dodge Bros. concern will manufacture as soon as its present contracts with the Ford Motor Co. terminate about July 1, is to be headed by Arthur I. Philp, for the past 2 years sales manager of the automobile division of the Studebaker Corp., according to an announcement just made. Mr. Philp takes up his new duties as general sales manager of Dodge Bros. on May 15. He was prominent in the Morgan & Wright concern and the United States Tire Co. before going to the Studebaker Corp.

L. J. Ollier, manager of the Los Angeles Studebaker branch will succeed Mr. Philp as Studebaker sales manager, while R. T. Hodgkins, head of the vehicle branch of Studebaker in New York becomes assistant sales manager.

### Ford Profit-Sharing Plan Extended to England

**DETROIT, MICH.**, April 20—The Ford Motor Co.'s profit-sharing plan has been extended to the employees of the Manchester, England, factory and to those in the branch in London, England, and to carry out the scheme, \$250,000 has been set aside for the purpose during the present year.

The new plan contemplates the decreasing of the working hours from 53 to 48 per week, while the earnings of all male employees of 22 years of age and older will be 30 cents an hour, or about \$15 per week. The official notice of the plan states that the profit-sharing will apply weekly, being added to the wages of those eligible to participate under the conditions. Any employees who are under 22 and who are the sole support of their families will be included in the eligible list with full profit-sharing benefits.

The general workings of the plan will be the same as hold for the mother factory here.

### Sphinx Co. Not Sure of Home

**YORK, PA.**, April 18—The Sphinx Motor Car Company, announced in THE AUTOMOBILE last week, was organized in York at a meeting of local and out-of-town business men held last Thursday evening in the Colonial Hotel. The new

company will be capitalized at \$250,000, of which \$150,000 will be common stock and \$100,000 will be preferred. Application for a charter will be made immediately and the location of the plant is now being considered. The company is desirous of locating its plant in the East, and besides York there are strong bids from Lancaster, Reading, Baltimore, Sharon and Salem, O. The company will make a car selling at \$600 or \$700. There will be two types, a five-passenger touring car and a roadster. Among those who are interested in the company are Herbert R. Averill, of York; Dr. Otto Schaeffer, of Baltimore; A. C. Auman, of Reading; Howard Rohrer, of Lancaster; Dr. B. C. Posey, John H. Dobbling, A. W. Sechrist and T. K. Roach, of York.

### \$10,299,000 Stock Issue To Replace Bonds

**NEW YORK CITY**, April 21—President Cartmell, of the Kelly-Springfield Tire Co. has issued a circular to stockholders and bondholders setting forth a plan for the retirement of the outstanding 4 per cent. income debenture bonds of the company, and the taking care of accrued dividends upon the outstanding preferred stock. The plan proposes the retirement of the entire bonded indebtedness of the company and for an authorized issue of stock amounting in the aggregate to \$10,299,000. A meeting of stockholders, as stated in THE AUTOMOBILE for April 16, has been called for May 4 to act on the plan.

After proposed issues of stock have been duly authorized, stockholders of record May 6 will have the privilege to subscribe and pay for on or before May 26, at par in proportion to their holdings \$3,089,700 par value of the 6 per cent. cumulative stock and \$1,029,000 of the 7 per cent. cumulative second preferred stock. The plan extends to holders of the

### Market Report of the Week

**T**he usual changes occurred in this week's market prices. The most important change was that of Pennsylvania petroleum, which experienced its first change since February, 1913. This occurred on Friday, when it came down \$0.10 per barrel. A further reduction at the end of the week brought the closing price down to \$2.30 at a reduction of \$0.20. Kansas petroleum dropped to \$0.85 a barrel. Copper was more freely offered and lower in the domestic market at the latter part of the week. Both electrolytic and Lake coppers dropped, the former \$0.00 1-8 and the latter \$0.00 1-4 per pound. The producers and selling agencies, as well as second hands, were more anxious last week to sell electrolytic copper at further concessions. The first effect of war would be to stimulate the copper industry, especially the brass trade, but the secondary effect would be depression. Apparently, however, neither producers nor consumers are concerned about this phase of the situation. There was a break in the London market for tin on Tuesday, attributed to the war scare. The domestic market sympathized with London with freer offerings at a decline of \$0.50 per 100 pounds, with very little demand from either consumers or speculators. Fine Up-River Para rose \$0.01 this week. Trading was quiet, with prices generally steady.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Changes
Antimony	.05%	.05%	.05%	.05%	.05%	.05%	
Beams & Channels, 100 lbs.	1.31	1.31	1.31	1.31	1.31	1.31	
Bessemer Steel, ton	21.00	21.00	21.00	21.00	21.00	21.00	
Copper							
Elec., lb.	.14%	.14 3/10	.14 3/10	.14 3/10	.14%	.14%	-.00%
Lake, lb.	.14%	.14%	.14%	.14%	.14%	.14%	-.00%
Cottonseed Oil, bbl.	7.46	7.42	7.40	7.42	7.41	7.42	-.04
Cyanide Potash, lb.	.17	.17	.17	.17	.17	.17	
Fish Oil, Menhaden, Brown	.40	.40	.40	.40	.40	.40	
Gasoline, Auto, bbl.	.16	.16	.16	.16	.16	.16	
Lard Oil, prime	.93	.93	.93	.93	.93	.93	
Lead, 100 lbs.	3.80	3.80	3.80	3.80	3.80	3.80	
Linseed Oil	.54	.54	.54	.54	.54	.54	
Open-Hearth Steel, ton	21.00	21.00	21.00	21.00	21.00	21.00	
Petroleum, bbl.							
Kans., crude	.90	.90	.80	.85	.85	.85	-.05
Pa. crude	2.50	2.50	2.40	2.50	2.30	2.30	-.20
Rapeseed Oil, refined	.50	.50	.50	.59	.59	.59	+.09
Rubber, Fine Up-river Para	.74	.74	.75	.75	.75	.75	+.01
Silk, raw Ital.			5.10		5.10	5.10	
Silk, raw Japan			4.25		4.38	4.38	+.13
Sulphuric Acid, 60 Baume	.90	.90	.90	.90	.90	.90	
Tin, 100 lbs.	36.00	36.00	36.50	36.50	36.00	35.50	-.50
Tire, Scrap	.04%	.04%	.04%	.04%	.04%	.04%	



4 per cent. income debenture bonds the privilege to surrender the bonds on or before May 15 and receive 6 per cent. cumulative preferred stock on the basis of one share of stock of the par value of \$100, with the right to accumulated dividends from April 1, for each \$100 face value of the bonds.

The plan provides for the payment of accumulated dividends now amounting to 78 1-2 per cent. on the present outstanding issue of preferred stock, by the issuance and delivery in payment thereof of an appropriate amount of new 7 per cent. cumulative second preferred stock at par. The Bankers' Trust Co. is named depository for the bonds.

### Garage Men to Protest Against Separators

NEW YORK CITY, April 21—The fire regulation which requires the installation of gasoline and oil separators in garages has caused such agitation that a hearing is to be given the automobile tradesmen by the municipal authorities, to be held at the fire headquarters on April 23 at 3 p. m.

Four associations in this city and Brooklyn will be represented at the meeting, where they will present their claims as to the uselessness of the device. The garage man and the dealer will be present to protest against the expense and to claim that the separators do not do the work for which they are intended.

### J. A. Kline Files Personal Bankruptcy Petition

RICHMOND, VA., April 21—*Special Telegram*—James A. Kline filed a voluntary petition in bankruptcy in the United States District Court yesterday. He is general manager

of the Kline Motor Car Corp., and formerly resided at York, Pa. His liabilities are \$182,262.98. Mostly notes upon which he is an endorser; assets \$106,797.82, mostly stocks and bonds.

Richmond, Washington, D. C., York and East Berlin, Pa., and Bath, N. Y., banks are creditors on notes. The secured claims total \$8,327.50. Assets consist of realty in York, Pa., valued at \$4,050; stocks and bonds \$52,835; and insurance policies, unliquidated claims, open accounts, half interest in other accounts all totaling \$106,797.82. What effect the failure will have upon the Kline Motor Car Corp. is not known.

### Dauch Gets Sandusky Parts Co.

SANDUSKY, O., April 15—The entire assets of The Sandusky Auto Parts & Motor Truck Company have been purchased by The Dauch Mfg. Co. This company has a capitalization of \$800,000, \$300,000 of which is preferred and \$500,000 in common. President and general manager is J. J. Dauch, who is also president and general manager of The Hinde & Dauch Paper Company. The new concern will manufacture the Sandusky Tractor and will also continue the line of high-grade motors for passenger cars and trucks, which were manufactured by the old company. The tractor has been built by Mr. Dauch for the last 8 years and is not a new product.

NEW YORK CITY, April 21—A dividend of 1 1-2 per cent. has been declared on the stock of the Pyrene Mfg. Co., payable May 1.

### Automobile Securities Quotations

NEW YORK CITY, April 22—The market for automobile and accessories securities was rather weak during the past 7 days. Several of the stocks which are listed on the New York Stock Exchange experienced slight losses out of sympathy with the general depression of the market. The oil stocks were generally weak, Vacuum Oil showing a decrease of 12 points as compared with last week's figures.

Firestone common showed a gain of 4 and Goodrich preferred a gain of 2. Goodyear common went up 10 points during the week. Other stocks which showed slight gains are New Departure, Pope Mfg. Co. common, and Willys-Overland common. The slight losses due to fluctuations of the market may be readily seen in the column headed Week's Change in the following table:

Security.	Wednesday		Thursday		Friday		Saturday		Monday		Tuesday		Week's	1913	
	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Bid	Asked	Change	Bid	Asked
Ajax-Grieb Rubber Co. com.	200		200		200		200		200		200			150	165
Ajax-Grieb Rubber Co. pfd.	99	102	99	102	99	102	99	102	99	102	98	102	+1	93	99
Aluminum Castings pfd.	98	100	98	100	98	100	98	100	98	100	98	100		98	100
Case, J. I., T. M. Co.	82½	86¼	82½	86¼	83½	86¼	82½	86¼	82½	86¼	82½	85	—¼	125	132
Chalmers Motor Co. com.	82½	87	82½	87	82½	87	82½	87	82½	87	82½	87		98	100
Chalmers Motor Co. pfd.		83		82		83		83		83		83		98	102
Electric Storage Battery Co.	50½	51	50	50½	50	50½	50	50½	50	50½	49½	50	—1½		
Firestone Tire & Rubber Co. com.	280	285	280	285	280	285	280	285	280	285	284	290	+4	275	285
Firestone Tire & Rubber Co. pfd.	107½	109	107½	109	107½	109	107½	109	107½	109	107½	109	+½	104	106
Garford Co. pfd.	80	90	80	90	80	90	80	90	80	90	80	90		99	100½
General Motors Co. com.	80	81	81	82	81	82	79¾	80	79¾	80	76	79	—5½	26	27
General Motors Co. pfd.	92	92½	92	92½	92	93	91	92	91	92	90½	92	—2½	73	74½
B. F. Goodrich Co. com.	27¾	27¾	27¾	28¼	28¾	29¼	28¾	29¼	28¾	29¼	26	27	+½	34½	35½
B. F. Goodrich Co. pfd.	86½	89½	88½	89½	88	89½	88	89½	88	89½	88½	90	+2	95	98
Goodyear Tire & Rubber Co. com.	165	170	165	170	165	170	165	170	165	170	170	178	+10	330	340
Goodyear Tire & Rubber Co. pfd.	96	99	96	99	96	99	96	99	96	99	95	96½		100	101½
Gray & Davis Co. pfd.	90	97	90	97	90	97	90	97	90	97	90	97			
International Motor Co. com.		5		5		5		5		5		5		5	10
International Motor Co. pfd.		15		15		15		15		15		15		25	40
Kelly Springfield Tire Co. com.	57	59	57	59	55	58	55	58	55	58	55	57	—2		
Kelly Springfield Tire Co. pfd.	535	540	135	140	135	145	135	150	135	150	135	145			
Lozier Motor Co. com.	19		19		19		19		19		28	31			
Lozier Motor Co. pfd.		65		65		65		65		65		60	—5		
Maxwell Motor Co. com.	7	7½	7	7½	8	8¼	8	8¼	8	8¼	8	8½	+½	5	8
Maxwell Motor Co. 1st pfd.	34	35	34	35	32½	33	33	34	33	34	33	34	+½	50	70
Maxwell Motor Co. 2d pfd.	11½	12	11½	12	12	12½	11½	12½	11½	12½	12	12½	+¼	20	30
Miller Rubber Co.	135	140	135	140	135	140	135	140	135	140	135	140		160	170
New Departure Mfg. Co. com.	122	123	122	123	122	123	122	123	122	123	123	124			
New Departure Mfg. Co. pfd.	105	106	105	106	105	106	105	106	105	106	105	106	+1		
Packard Motor Co. com.	103		103		103		103		103		103				
Packard Motor Co. pfd.	94	98	94	98	94	98	94	98	94	98	94	98			
Peerless Motor Co. com.	15		15		15		15		15		15			35	45
Peerless Motor Co. pfd.		75		75		75		75		75		75		95	100
Pope Mfg. Co. com.	2	5	2	5	2	5	2	5	2	5	2	4	+1	16½	18½
Pope Mfg. Co. pfd.	12	15	12	15	12	15	12	15	12	15	10	15		55	58
Portage Rubber Co. com.		25		25		25		25		25		25		35	42
Portage Rubber Co. pfd.		75		75		75		75		75		75		90	94
*Reo Motor Truck Co.	7	8¼	7	8¼	7	8¼	7	8¼	7	8¼	7	8¼	—¾	11¼	12½
*Reo Motor Car Co.	19¼	19¾	19¼	19¾	19¼	19¾	19¼	19¾	19¼	19¾	19¼	21		21	22
Rubber Goods Mfg. Co. pfd.	40	50	40	50	40	50	40	50	40	50					
Russell Motor Co. com.	60	61	60	61	60	61	60	61	60	61					
Russell Motor Co. pfd.	100	102	100	102	100	102	100	102	100	102					
Splitdorf Electric Co. pfd.	40	50	40	50	40	50	40	50	40	50	40	50			
Stewart Warner Speed'ter Corp. com.	60	61	60	61	60	61	60	61	60	61	55	59			
Stewart Warner Speed'ter Corp. pfd.	100	102	100	102	100	102	100	102	100	102	99	101	—1		
Studebaker Co. com.	32½	33	32½	33	31½	32	32	33	32	33	31	32	—2	28	30
Studebaker Co. pfd.	85	86½	85	86½	85	86½	85	86½	85	86½	85	86½		89	93
Swinehart Tire & Rubber Co.	60	65	60	65	60	65	60	65	60	65	60	65		92	95
Texas Company	147¼	148	146	146¾	137¾	138	139½	140	139½	140	139	140	—1		
U. S. Rubber Co. com.	57	57½	58	60	58	58½	57¼	59½	57¼	59½	56¼	57	—3¼	20	30
U. S. Rubber Co. 1st pfd.	101½	102	101½	102	101½	102	101½	102	101½	102	101½	102	—2¼	64	64½
Vacuum Oil Co.	220	228	223	225	223	227	220	228	220	228	212	216	—12		
White Co. pfd.	107	110	107	110	107	110	107	110	107	110	107	110		107½	109
Willys-Overland Co. com.	64	66	65	67	65	67	65	67	65	67	65	67	+1	62	68
Willys-Overland Co. pfd.	89	94	89	93	89	93	89	93	89	93	89	94		92	96

\*The par value of these stocks is \$10; all others \$100.



Branch managers, road men and guests at Hess-Bright quarterly convention in Philadelphia

## Two Away Each Half Minute in Big French Grand Prix

**Last Man Off in 20-Mile Circuit When First Pair Are Due in Stretch**

PARIS, April 10.—Competitors in the French Grand Prix at Lyons, on July 4, will start in pairs at intervals of thirty seconds. Cars with odd numbers will be on the right-hand side of the road, and those with even numbers on the left. As the course is not much more than twenty miles round, and there are forty-one competitors, this is the only method of getting the last man away before the first one is due round. The starting order was decided by the drawing of lots, this drawing affecting the cars only and not the drivers. Some firms have not yet announced their drivers, and in any case they can let the men composing a team start in any order they wish, without, however, changing the order of the cars. The following list is official so far as the cars are concerned, but may undergo some modifications with regard to the drivers:

1. Alda .....	Tabuteau	22. Nazzaro .....	Porporato
2. Opel .....	Joerns	23. Delage .....	Bablot
3. Nagant .....	Elskamp	24. Sunbeam .....	Resta
4. Vauxhall .....	Hancock	25. Piccard-Pictet .....	
5. Peugeot .....	Boillot	26. Aquila-Italiana .....	
6. Schneider .....	Champoiseau		Beria d'Argentina
7. Caesar .....		27. Fiat .....	Fagnano
8. Nazzaro .....	Nazzaro	28. Mercedes .....	Pilette
9. Delage .....	Guyot	29. Alda .....	
10. Sunbeam .....	Chassagne	30. Opel .....	
11. Piccard-Pictet .....		31. Vauxhall .....	Leslie Munroe
12. Aquila-Italiana .....	Marsaglia	32. Peugeot .....	Rigal
13. Fiat .....	Cagno	33. Schneider .....	Juranon
14. Mercedes .....	Lautenschlager	34. Nazzaro .....	De Moraes
15. Alda .....	Petit	35. Delage .....	Duray
16. Opel .....		36. Sunbeam .....	K. Lee Guinness
17. Nagant .....	Esser	37. Aquila-Italiana .....	Constantini
18. Vauxhall .....	Watson	38. Fiat .....	Scales
19. Peugeot .....	Goux	39. Mercedes .....	Wagner
20. Schneider .....	Gabriel	40. Mercedes .....	Salzer
21. Caesar .....		41. Mercedes .....	Nagel

### Open Sioux City Speedway July 4

NEW YORK CITY, April 18.—A two-mile oval motordrome is to be dedicated in this city on July 4 with a race and aviation exhibitions for which \$35,000 is guaranteed by the Sioux City Automobile Club and Speedway Association, backed by the Commercial Club of the city.

Sanction of the A. A. A. has been obtained and entry blanks are published for a 300-mile race, as follows:

Class "E", non-stock, open to cars with a piston displacement of 450 cubic inches or less, and a minimum weight of 1600 pounds. Ten cash prizes are to be awarded. First prize will be \$10,000; second, \$5,000; third, \$2,500; fourth, \$1,750; fifth, \$1,500; sixth, \$1,100; seventh, \$900; eighth, \$800; ninth, \$750; tenth, \$700. The trophies will be announced later.

### Hess-Bright Men Attend Convention

PHILADELPHIA, Pa., April 17.—The two-days' convention of branch managers and road men of the Hess-Bright Company

was brought to a successful close this evening. This is a quarterly event and is for the purpose of furthering the interests of the company by enabling the executives, department managers and outside men to get together to plan sales, advertising and production work for the ensuing three months.

At the business meeting reports were made of district conditions by all the branch managers. The meeting was in charge of Messrs. Bright and Gray.

On the morning of the second day a tour of the factory was made. After luncheon at the company's clubhouse the entire party went to the National League ball park.

In the evening a banquet was held at the Bellevue-Stratford. Mr. Gray was toastmaster and many excellent speeches were heard.

### Midgley Purchases Flint Glass Plant

LANCASTER, O., April 16.—The entire plant of the Ohio Flint Glass Co. in this city, has been purchased by the Midgley Tire & Rubber Co., for the manufacture of the Midgley non-skid tread tire.

The acquisition of this plant brings to an end the long litigation over the Midgley tire patents, which caused these tires to be withdrawn from the market a little over 3 years ago, or just prior to the taking over of the Hartford Rubber Works Co., Hartford, Conn., by the present U. S. Tire Co.

In the new company, of which Mr. Davis is president, Mr. Midgley becomes vice-president and general manager under a long term of contract, relinquishing his position as consulting engineer of the U. S. Tire Co. \$100,000 in capital stock has been subscribed by Lancaster interests in the company and it is the intention of Mr. Davis that the remaining stock, \$400,000, shall be sold largely to automobile owners and dealers. There is no preferred stock. The executive offices of the company are in the Farmers' Bank Bldg., Pittsburgh.

### Manhattan Automobile Club Assigns

NEW YORK CITY, April 22.—The Manhattan Automobile Club, Inc., today assigned for the benefit of the creditors to Samuel E. Stern. The board of directors took this action to conserve the assets for the creditors. Failure of the members of the club to pay their dues and the failure on the part of many subscribers to the capital stock to fulfill their subscription contracts are given as the difficulties. Some weeks ago an offer was made to secure additional stock for subscription and a number of the larger manufacturers subscribed for stock conditionally, the agreement to become binding in the event that ten of the larger manufacturers subscribed \$1,000 each and that \$5,000 was raised by the payment of stock within New York City. The directors were able to obtain subscriptions for nearly \$5,000 locally but only six of the larger manufacturers came in on the other part of the proposition.

The club occupies three floors of the Gainesborough Studio, 222 West Fifty-ninth street. The assets appearing on the books amounted to \$15,000 with nearly \$12,000 liabilities. The assets, however, consist of unpaid subscriptions. The assignee has called a meeting of the creditors at his office for Friday of this week at 2 o'clock.



## French Cars Now En Route —Speedway Entries Total 27

Stafford and Metropol in Competition—Accessory Prizes Reach \$7,275—Elimination Trials Expected

INDIANAPOLIS, IND., April 21.—With four foreign cars due to sail tomorrow on the *Oceanic* from Cherbourg for the United States, the Indianapolis Speedway management is already in the preliminary "thrills" just ahead of the Decoration Day 500-mile race.

It is believed that there will be a field of thirty cars contesting for honors and the fast-growing list of prizes. There seems little doubt that elimination trials will have to be held.

Two Maxwells have been entered by the Maxwell company with Tetzlaff and Carlson as drivers and another Maxwell by W. S. Bennett of Indianapolis, with either Hemery or Naz-zaro as possible driver.

Other entries are a Metropol, with Joe Horan at the wheel, and a Stafford, made in Kansas City, driven by Jesse Callahan, former mechanic to Louis Disbrow. Horan was formerly of the Amplex and Lozier camps.

### 27 Cars Now Entered

The total field to date embraces twenty-seven cars and drivers, as follows: Burman, Burman and one other; Stutz, Oldfield, Cooper and Anderson; Gray Fox, Wilcox; Beaver Bullet, Keene; Peugeot, Goux, Boillot and Duray; Sunbeam, Grant and Chassagne; Delage, Guyot and Thomas; Excelsior, Christians; King, Klein; Mercedes, De Palma and Mulford; Mercer, Wishart, Pullen and Bragg; Marmon, Dawson; Stafford, Callahan; Metropol, Horan, and Maxwell, Carlson, Tetzlaff and perhaps Hemery or Naz-zaro.

In addition there are expected as entries three M-sons, a couple of Isottas, a Keeton, another Marmon, handled by Wilbur De Alene, of Los Angeles; two Case cars, a privately entered Pope-Bullet, and a couple of others not classified for lack of a name.

### A \$1,500 Carburetor Prize

NEW YORK, April 20.—The J. B. Carburetor Corporation, of Los Angeles, Cal., has deposited with the A. A. A. \$1,500 as prize money for the winner of the Indianapolis race using the J-B carburetor. This brings the total accessory prize money to \$7,275.

The J-B carburetor, which is a newcomer to the field, embraces several novel features of construction. Regulation of the fuel through the jet is controlled by a thermostat, and there are no needle valves. The gasoline level is controlled by a float and a ball-seated valve.

The gasoline jet is contained within the core of a post, which projects into an extra large air passage. Above the gasoline level in the post are a number of perforations through which the primary air current is drawn. The auxiliary air is drawn in through a passage made by the lifting of a flap valve through the suction of the engine.

### French Drivers Sail May 9

PARIS, April 11.—The two Delage, the Excelsior and the three-liter Peugeot racing cars entered for the Indianapolis 500-mile race will be shipped for America on the *Oceanic*, sailing from Cherbourg on April 22. Several of the European drivers have secured accommodations on the French liner *La Provence*, sailing from Havre on May 9. This

party includes Arthur Duray, handling the 3-liter Peugeot; Albert Guyot and Rene Thomas, the Delage drivers; Joseph Christians, who has entered the six-cylinder Excelsior; Jean Chassagne; W. F. Bradley, who will look after the interests of the Delage and Excelsior teams in America, and the respective mechanics for these cars.

### Officials Chosen for 500-Mile Race

INDIANAPOLIS, IND., April 20.—Tom Hay, of Chicago, has been appointed starter for the 500-Mile Race. David Beecroft has been chosen acting representative of the A. A. A. with F. E. Edwards and A. R. Pardington mentioned for referee and technical examiner, respectively. During the race, Mr. Beecroft will be in absolute control.

Positions during the flying start will be determined by the speed of the cars in the elimination trials. This plan is designed to do away with congestion at the start.

### Monmouth Raceabout To Cost \$650

ASBURY PARK, N. J., April 20.—Specifications of the Monmouth raceabout have just been announced and deliveries will begin in July. This new car is capable of better than 60 miles per hour, it is said. It is equipped with an L-head block motor, rated at 20 horsepower, cone clutch and three-speed gearset, has a tread of 52 inches and lists at \$650, fully equipped. The motor, clutch, and gearset are combined in one unit. The clutch is a cone and the gearset is sliding gear type. Ignition is by Bosch high-tension magneto. From the gearset, the power is transmitted to the rear axle by a straight-line drive shaft equipped with Spicer universals. A gear ratio of 3 to 1 is used. The wheelbase is 100 inches, and wire wheels 30 by 3 are employed. The car is made by the Brown Cyclecar Co., Asbury Park, N. J.

### Lulu Cyclecar Sells for \$398

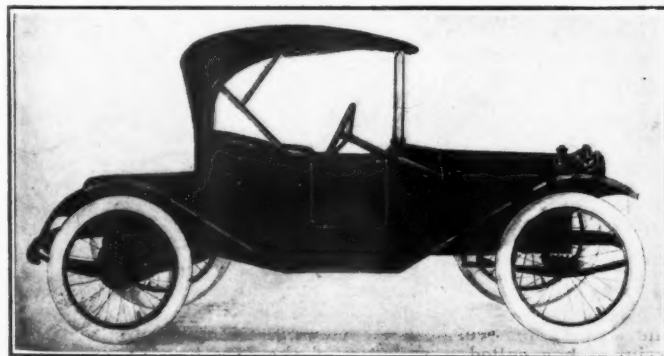
BEAVERTOWN, PA., April 20.—The Kearns Motor Truck Co., has brought out a side-by-side seater, known as the Lulu cyclecar, that has all the earmarks of the large car. While it is to sell for \$398, it has a four-cylinder water-cooled motor, three-speed selective gearset, shaft drive and differential. Left steering and center control are used.

The motor is a block casting and is cooled by the thermosiphon system. Motor, clutch and gearset are built into one unit. A high-tension magneto is used and lubrication is by splash aided by a pump.

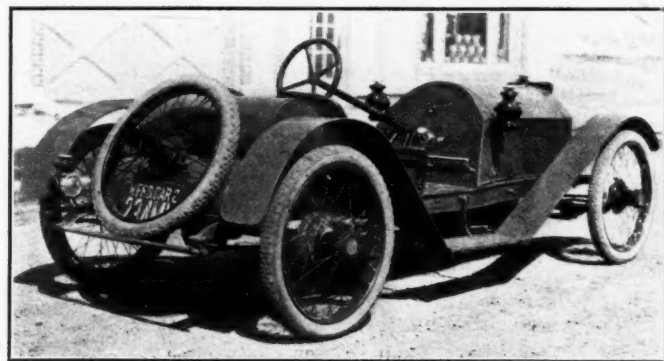
The equipment is full including, electric lights, top with side curtains, windshield, electric horn. Nickel and black finish is used on all metal parts.



New King racer for Indianapolis, with Klein at the wheel



Lulu cyclecar made by Kearns Truck Company to sell for \$398



Monmouth raceabout, which will be made for \$650

## New York City Gets Reduced Taxicab Rates—New Zones

Rate for Hourly Service Is Also Reduced  
From \$2.50 to \$2 Per Hour of Use

**N**EW YORK CITY, April 18—Reductions in taxicab service rates from the Grand Central Terminal, the Lackawanna at West Twenty-third street, and the West Shore at the foot of West Forty-second street was put into effect yesterday by the Westcott Express Co.

The zone formerly established, which radiates from the West Shore Terminal, is bounded on the west by the Hudson River, on the north by Fifty-ninth street, on the south by Twenty-sixth street, and on the east by Lexington avenue. A charge of 75 cents was made in that area. The new schedule establishes another zone bounded on the north by Fiftieth street, on the south by Thirty-fourth street, and on the east by Sixth avenue, and the charge is 60 cents in this district. The charge of 75 cents will continue in effect for sections in the old area beyond the limits of the new zone.

The old 75-cent zone from the Grand Central extends from river to river and from Twenty-sixth street on the south to Fifty-ninth street on the north. The new 60-cent zone extends from Second avenue on the east to Seventh avenue on the west and from Twenty-sixth street on the south to Fifty-ninth street on the north. The old Delaware & Lackawanna zone extends from Fourth avenue to the Hudson River and from Fourteenth street to Thirty-fourth street. The charge was 75 cents. The new zone in which the charge will be 60 cents is from Sixth avenue on the east to the Hudson river on the west and from Fourteenth street on the south to Thirty-fourth street on the north.

These fares are for one or two persons. The rates in the new zones will be 85 cents for three or four more persons instead of \$1, as formerly, and \$1.25 for five or six persons instead of \$1.50 as formerly.

The rate for hourly service is also reduced from \$2.50 to \$2 per hour. Additional time will be 50 cents for a period of 15 minutes instead of 12 minutes, as formerly, and for stops 50 cents for a period of 15 minutes instead of 12 minutes, as formerly.

### Franklin Economy Test May 1

**SYRACUSE, N. Y., April 18**—On the morning of May 1, every Franklin dealer in the United States is scheduled to disconnect the regular gasoline tank on his 6-30 Franklin, put on a one gallon can and under the supervision of automobile club officers or other impartial observers to see how far he can go on a gallon of gasoline.

It is estimated that from 150 to 200 cars will participate in this test over all parts of the country. The idea being to secure an average mileage per gallon figure. It is aimed to secure facts and figures from a thoroughly practical and fair standpoint. The rules for the test are as follows:

1. The test must be made by a Franklin Six-Thirty touring car on Friday morning, May 1.
2. Only one gallon of gasoline must be used. This to be carried in a one-gallon can attached to the side lamp bracket, and the regular gasoline tank disconnected. A gallon measure, which has been certified by the local sealer of weights and measures, to be used to measure the gasoline.
3. No matter what the weather or road conditions are the test must be made on this day.
4. Each car in the test must carry as passengers an official of the local automobile club or other observers who will be absolutely impartial and whose supervision will be considered as official as far as possible.
5. The most important consideration is absolute accuracy in every detail.
6. The actual mileage secured must be certified to by both driver and observers before a notary public.

### Another Light Car To Sell for \$600

**DETROIT, MICH., April 21**—New York capital to the extent of \$250,000, all subscribed, is said to be back of a new light car proposition which has been designed here by W. H. Radford, former chief engineer of the Warren Motor Car Co. No name has yet been given to the new concern which proposes to establish a factory here and to turn out about 3,000 cars for the first year.

The car is equipped with a 2 7-8 by 4 block four-cylinder engine designed by the Corsair Motor Co. It is water-cooled by thermo-syphon and has Connecticut ignition. The wheel-base is 100 inches and the tread standard. With electric lighting the car is intended to sell for \$600 with a four-passenger body. Other specifications include shaft drive, Walker-Weiss semi-floating rear unit with which is incor-

porated a set of gearless differentials to take the place of the conventional spur gear differential. A three-speed gearbox is located at the rear axle. A one-man top is a part of the equipment.

Although the definite organization of the company has not been completed, Mr. Radford has headquarters at 500 Moffat Bldg., this city.

### Deppé Vaporizer Shows Economy in Test

**NEW YORK CITY, April 21**—In a test by Joseph Tracy in East Rutherford, N. J., the Deppé vaporizer was fitted on a White 30 horsepower engine in order to give horsepower and fuel results at half open throttle. All runs lasted 5 minutes. The following was obtained:

R.P.M.	Weight on dynamometer arm in lbs.	Temperatures °F		H.P.	Lbs. fuel used in run	Lbs. fuel per H.P. per hour
		Water	Room			
400	28.5	131	165	8.68	.50	.69
500	29.25	133	162	11.14	.59	.63
800	29.25	129	150	17.83	.90	.60
1,000	27.5	131	151	20.95	1.08	.61
1,200	27	132	149	24.68	1.37	.66
1,400	24	135	150	25.60	1.56	.73
1,600	21.25	131	145	25.90	1.42	.65

The vaporizer is an instrument about 8 inches long, less than 3 inches in diameter outside and becomes a part of the manifold passage between carburetor and cylinders. It contains a Stanley atomizer, the heli coil of which revolves from three to five times per second for each linear foot of the mixture passing through the lower portion of the vaporizer, according to the speed of the engine. The atomizer agitator is an improvement on the original form of the Stanley mixer. This atomizer is said to break hydrocarbons in any oil fuel into air-floating globules, to an extent that the evaporation is so intense, the temperature falls as low as 10 degrees Fahrenheit in spite of preheated air fed to the carburetor inlet.

The upper portion of the vaporizer has the ability to raise the temperature of the mixture after it has passed through the carburetor and atomizer high enough to permit of the mixture reaching intake valves above the boiling point of the oil fuel. Patent is pending.

**DETROIT, MICH., April 21**—Five hundred dollars in gold and a silver loving cup have been hung up as the prize to the Briggs-Detroit distributor who sells the largest number of cars during the months of April, May and June. The contest was started the first of the month, and has already gained good headway. The prize will be awarded at the July meeting of the distributors at the factory.

The rules governing the contest state that every distributor is eligible, that each contestant must make a weekly report of sales, giving factory number of cars sold, that the distributor's book accounts will be accepted as proof of sale, that the winning distributor may keep the prize intact or he may split it among his salesmen, that each week the Briggs-Detroit Co. will advise all contestants of the three highest, but will not disclose the number of cars each has sold, that orders must be allowed 30 days for delivery. The contest closes on June 30 at midnight.

Last year the Briggs-Detroit Co. conducted a similar contest, but the prize was not so large. J. R. Overstreet, Fort Worth, Texas, won this contest, while the Brice Auto Co., Minneapolis, and the T. G. Northwall Co. ranked second and third.

### Brewster To Import Rolls-Royce

**LONG ISLAND CITY, N. Y., April 22**—Brewster & Co., of this city will import the Rolls-Royce car and at the present time some cars of that make are now on the way here from Coventry. The new cars will be exhibited at the New York City show room of the Brewster company in the near future.

### J. W. Johnson Heads Lee Tire Co.

**PHILADELPHIA, PA., April 17**—J. W. Johnson, president of the Johnson & Johnson Company, New Brunswick, N. J., has been chosen president of the Lee Tire & Rubber Company, of Conshohocken, Pa., vice J. Ellwood Lee, deceased.

### Cameron Fails Owing \$15,000

**WEST HAVEN, CONN., April 17**—The Cameron Manufacturing Company of West Haven, Conn., is bankrupt. While the capital of the concern was to have been \$1,000,000, but \$18,000 is said to have been actually paid in. The present liabilities are placed at approximately \$15,000. A receiver is to be appointed.

**NEWARK, N. J., April 20**—H. Percy Jones, secretary of Phineas Jones & Co., died suddenly at Los Angeles, Cal., Saturday, April 11. The funeral is to be held in Newark Thursday, the 23rd, at 2:30 p. m.



# Factory Miscellany

## BEAVER'S First Building Finished—

The first building of the Beaver State Motor Co.'s factory at Gresham, near Portland, Ore., has been completed. This unit is 204 feet long by 64 feet wide. It is built of reinforced concrete and pressed brick and has 4,000 cubic feet of window area, which admits abundant light for the operation of the machinery. This building is the first unit of a plant that ultimately will cover several acres. Construction of the present building was hurried forward as rapidly as possible to enable the company to fill its orders for Beaver automobiles this year. The directors of this company are P. A. McComb, president; A. B. Averill, vice-president; J. L. Bailey, secretary; G. H. Johnson, W. H. McMonies, E. J. Jaeger, R. B. McClung, L. L. Paulson, E. O. Eastman, who were present at the inspection and acceptance of the new building. The factory is located on a five-acre tract fronting the section line road at Gresham.

**Brown Co. Makes Accessories—**The Brown Mfg. Co., Wilmington, O., is fitting up a factory for the manufacture of automobile specialties. Practically all the necessary machine tools have been purchased.

**Raised \$18,000 for New Plant—**The citizens of Canal Dover, O., have raised by subscription a sum of \$18,000 for the purpose of securing the location of the plant of the Braun-Hoff Electrical Co., maker of electrical motors.

**Apple Top's Factory Plans—**The Apple Auto Top Co., Miamisburg, O., has had plans prepared for a factory building that will be two stories, 100 by 250 feet, of regular mill construction. Nothing is known as to equipment needs.

**May Purchase Ingersoll Plant—**It is reported that Wilson & Short, Detroit, Mich., will purchase the plant of the Standish Mfg. Co., at Ingersoll, Ont., and install machinery and equipment for the manufacture of automobile specialties.

**Auto Valve Co. Builds—**The Auto Valve Co., Ironton, O., has been incorporated with \$10,000 capital stock by Otto Ebert, and others. A small factory will be fitted up at an early date for the manufacture of an automobile specialty.

**Trenton Rubber Cos. Build—**The Luzerne Rubber Co., Trenton, N. J., will build a two-story brick addition to its factory. The Olden Rubber Mfg. Co., Trenton, N. J., will erect a factory of brick construction at an estimated cost of \$10,000 for the manufacture of rubber specialties, etc. D. W. Lovett is manager.

**Aetna Truck Will Build—**The Aetna Motor Truck Co., Detroit, Mich., organized to manufacture automobile trucks, has been incorporated with \$150,000 capital stock. The company is negotiating for a factory and expects to begin operations in the near future. Directors are J. G. Wagner, E. E. Kinney, J. J. Wilson and W. A. Eldred.

**Two Racine Cos. Build—**The Racine

## The Automobile Calendar

April 25	.....Columbia, S. C., Track Race, J. A. Sloan.
April 29	.....Norfolk, Va., Track Meet, J. A. Sloan.
May 2-9	.....Philadelphia, Pa., Cyclecar Show, Hotel Majestic.
May 2-27	.....Tulsa, Okla., Ozark Trails Good Roads Convention.
May 5	.....New York City, S. A. E., Electrical Equipment Division Meeting.
May 9	.....Atlanta, Ga., Third Annual Hill Climb, Atlanta Auto & Accessory Assn.
May 12	.....New York City, S. A. E., Ball and Roller Bearings Division Meeting.
May 14	.....New York City, S. A. E., Motor Testing Division Meeting.
May 23-24	.....New York City Dealer's Business Demonstration, Motor Dealers Contest Assn.
May 25-26	.....Palermo, Sicily, Targa Florio, 700-Mile Race.
May 28-30	.....Chambersburg, Pa., Trys over Lincoln Way from Chambersburg to Pittsburgh, Chambersburg Motor Club.
May 30	.....Newark, N. J., Cyclecar Run, Newark Cyclecar Club.
May 30	.....Indianapolis, Ind., 500-Mile Race, Indianapolis Motor Speedway.
June 1	.....Palermo, Sicily, Coupe Florio, 279-Mile Race.
June 17-18	.....Fayette Co., Pa., Second Annual Hill Climb, National Pike.
June 18	.....Uniontown, Pa., Hill Climb, Auto Club of Fayette Co.
June 23-26	.....S. A. E. Summer Meeting, Cape May, N. J., Cape May Hotel.
June 24-26	.....Chicago, Ill., Seventh Annual Meeting of Nat. Gas Engine Assn.
June 27-July 4	.....A. A. A. Touring Week.
June 30	.....London, Eng., Fourth International Rubber and Allied Industries Congress.
July 3-4	.....Tacoma, Wash., Montamara Feste Races, Tacoma Speedway Assn.
July 4	.....Sioux City, Iowa, 300-Mile Race, Sioux City Auto Club and Speedway Assn.
July 4	.....Lyons, France, French Grand Prix.
July 13-14	.....Seattle, Wash., Track Races, Seattle Speedway Assn.
July 25-26	.....Belgium Grand Prix Road Races.
Aug. 21-22	.....Chicago, Ill., Elgin Road Races, Chicago Automobile Club.
Aug. 23	.....Auvergne, France, Coupe de l'Auto Race.
Sept. 9	.....Corona, Cal., Road Race, Corona Auto Assn.
Sept. 26-Oct. 6	.....Berlin, Germany, Automobile Show.
Oct. 9-Nov. 2	.....S. A. E. Europe Trip.
Oct. 17-24	.....Pittsburgh, Pa., Automobile Show, Auto Dealers Assn., Inc.
Oct. 19-26	.....Atlanta, Ga., American Road Congress of the American Highway Assn. and the A. A. A.
November	.....El Paso, Tex., Phoenix Road Race, El Paso Auto Club.
November 8-11	.....Shreveport, La., Track Meet, Shreveport Auto Club.
November 15	.....Paris, France, Kerosene Motor Competition.

Mfg. Co., Racine, Wis., is building an addition to its factory, 100 by 280 feet, four stories, of brick construction, for the manufacture of closed automobile bodies. The equipment has been pur-

chased. The Lewis-Petard-Cram Motor Co., Racine, Wis., has awarded the contract for structural improvements to its plant. It is buying new tools and equipment from time to time as needed.

**DePere May Build Cycle Car Plant—**The DePere Civic League, DePere, Wis., has received a proposition from outside parties to establish a cyclecar factory in that city if local capital can be interested. It is proposed to start a company with \$75,000 capital, about one-third of which is to be local money. Preliminary investigation shows much favorable sentiment.

**Schwarz Spring Co. Purchases Plant—**The Schwarz Spring Co., Philadelphia, Pa., has been incorporated by Henry Hess, and others, for the manufacture of automobile springs, cushion truck wheels, etc. The company has increased its capitalization from \$10,000 to \$200,000, and has purchased a factory at Tioga and Memphis streets. Orders have been placed for the initial equipment. C. L. Schwarz is general manager.

**Visit Paige Factory—**That automobile dealers today look more thoroughly into cars and factories in their search for the car they want to handle was evidenced recently in Detroit. F. E. Murphy, of the Murphy Automobile Co., the Paige Northwestern distributor at Minneapolis, came to Detroit with a large contingent of prospective dealers. Two days were spent in investigations of the different automobile factories of the city.

**Jeffery Force Increased—**New men are constantly being added to the working force of The Thomas B. Jeffery Co., Kenosha, Wis. Since the first of the year the Jeffery company has been operating 13 hours a day and during this period shipments have increased 104 per cent. over the shipments during the corresponding period of last year. The daily average is now thirty-five cars a day, two hundred and eight having been shipped last week.

**Aluminum Specialty Will Increase—**The Aluminum Specialty Co., Manitowoc, Wis., has been reorganized and the capital increased from \$25,000 to \$50,000. The output will be increased at once and a larger variety of material produced. Walter Spindler, of Manitowoc, has taken a large financial interest and will devote his personal attention to the business. The company was formed three years ago by employees of several of the large aluminum foundries in Manitowoc and has been doing a good business, although handicapped by lack of large working capital.

**Make Downing Cars in New Castle—**H. O. Carter, general manager of the Downing Cycle Car Co., of Detroit, Mich., has secured the factory of the Penn Motor Car Co., New Castle, Pa. The acquisition of this big plant by the Downing company gives them the largest cycle car plant in the United States, the floor space covering over 84,000 square feet. Production of the Downing cycle cars on present contracts for over \$400,000 worth of cars will begin in thirty days from the New Castle plant.

# The Week in the Industry



## Motor Men in New Roles

**K**RAUS Partin Advertising Manager—J. M. Kraus has been made advertising manager of the Partin Mfg. Co., Chicago, Ill.

**New Splitdorf Additions**—The Splitdorf Electrical Co., Newark, N. J., is slowly spreading a net of branch houses throughout the country. Cincinnati now has its branch at 811 Race street; in Dallas there has been opened a branch located at 402 South Ervay street; Dayton is now favored with a branch located at 427 East Third street, while Canadian headquarters for the Splitdorf electrical line have been established at 469 Yonge street, Toronto. H. J. Hinley, the manager of the long established Detroit branch, supervises the management of the Dayton and Cincinnati branches, while E. A. Kelly, the Chicago Splitdorf sales manager, has placed E. C. McKinney in charge of the Dallas branch, which he controls while he is preparing to open a branch at Minneapolis. O. J. Rohde, who manages New York, Newark, Philadelphia and Atlanta branch houses, opened up the headquarters in Toronto. C. O. Dail, for several years associated with the Swinehart tires, has been placed in charge of sales for the western territory, with headquarters in Chicago. He takes the place of Fred Cornell, who is now manager of the Apple Electric Co., Dayton, Ohio, recently acquired by the Splitdorf Electrical Co.

**Harris Succeeds King**—C. B. Harris has been named to succeed C. H. King as sales manager for the Keats Automobile Co. in Portland, Ore.

**Fleischer Stewart-Warner Manager**—Fred. Fleischer, of the Stewart-Warner Speedometer Co., has been appointed manager of the Buffalo, N. Y., branch, and will leave for that city shortly.

**Noble Resigns**—A. S. Noble, for the past 2 years vice-president of the J-M Shock Absorber Co., has resigned from that company because of ill health. No plans for the future have as yet been made.

**Clough Changes Position**—C. Roy Clough, formerly connected with the Chalmers company, as state agent, has taken the position of manager of the Brasher Motor Car Co., Columbus, O., agent for the White and Waverly.

**Benjamin Elected Vice-President**—C. L. Benjamin, advertising director of the Cutler-Hammer Mfg. Co., Milwaukee, Wis., has been elected first vice-president of the central division of the Associated Advertising Clubs of America, Milwaukee.

**Reuter in New Capacity**—A. L. Reuter, until now tire expert for the Milwaukee branch of the Thos. B. Jeffery Co., has become associated with the Badger Tire Repair Co., Milwaukee, Wis., as general manager. This company is state agent for Kelly-Springfield tires.

**Monson Representing Motometers**—C. S. Monson, who recently opened offices in the Dime Bank Building in Detroit, Mich., has become factory rep-

resentative for the Motometer company, of New York. This company makes the Boyce motometer radiator heat indicator.

**O. Hart in New Capacity**—O. Hart, for six years connected with the Thomas B. Jeffery Co., Kenosha, Wis., and lately in charge of their truck department, has purchased an interest in and will manage the business of the Sears Automobile Co., Des Moines, Ia., distributors for the Reo and Mitchell.

**Hoeller Makes Change**—Joseph Hoeller, for 14 years superintendent of the gasoline engine department of the Gilson Mfg. Co., Port Washington, Wis., and associated with the concern for 25 years, has resigned to become superintendent and designer for the gasoline engine department of the Brillion Iron Works, Brillion, Wis.

**Duck Resigns from Locomobile**—G. H. Duck has resigned as New York City truck sales manager for the Locomobile Co. of America, to be succeeded by F. H. Colver, who held a similar position at the Philadelphia, Pa., branch. Mr. Duck has not as yet decided as to his future plans, but he states that he will stay in the automobile field.

**Heads Southern Assn.**—Joseph Schwartz, Louisiana distributor for the Buick, was elected president of the All-South Transcontinental Highway Assn. The association is composed of the most active members of the automobile clubs in this section of the South, and has as its object the establishment of the Mississippi, Louisiana and eastern Texas section of the All-Southern Highway, which is to connect Savannah, Georgia and San Diego, Cal.

## Garage and Dealers' Field

**Gardinier Has R-C-H**—In THE AUTOMOBILE for April 9 it was stated that I. D. Lundy has been appointed R-C-H dealer at Utica, N. Y. This should have been I. R. Gardinier.

**Handles Star Vulcanizing Outfit**—The Star Vulcanizer Manufacturing Co., 274½ North High street, Columbus, O., has placed on the market a complete vulcanizing outfit known as the Star.

**Railroad Uses Gas-Electric Cars**—The announcement is made by the officials of the Detroit, Toledo & Ironton Railroad Co. that gasoline-electric cars will be in use on its line between Lima, O., and Baimbridge, by July 1.

**Norma Branch Moves**—The Norma Co. of America, maker of Norma ball, roller, thrust and combination bearings, announces the removal of its offices, on April 11, from 20-24 Vesey street, to 1790 Broadway, New York City.

**New Dahl Tire Filler Agent**—The Hayes Punctureless Tire Co., 203 East Town street, Columbus, O., has become state distributor for the Dahl punctureless tire filler. The company also acts as agent for the Stanwell wire wheels and rims.

**Buys Out Federation Supply**—The New Federation Supply Co., New York City, has bought out the stock of the Federation Supply Co., and will reorganize the business to continue at the same location, 53 Franklin Square. It will have a capital of \$25,000.

**Overland's New St. Louis Bldg.**—The Overland Automobile Co., St. Louis, Mo., is moving into its new home, an up-to-date five-story fireproof building on Locust street. The building contains 25,000 square feet of floor space and can store 300 automobiles. The building is equipped with a modern machine shop and paint room, while the storeroom contains some \$15,000 worth of parts.

**Exide Battery Depot Opened**—Announcement is made of the opening of the Exide Battery Depots, Inc., on 23d street, west of 10th avenue, New York City. This garage, exclusively for electric vehicles, is modern and complete in every respect. With capacity for 100 commercial electric cars, it is claimed that it is the largest public garage not only in Greater New York, but in the country.

**Will Handle Portage Tires**—C. Edwin Neumann, Milwaukee, Wis., for several years assistant manager of the Milwaukee branch of the Fisk Rubber Co., has organized a new tire and supply concern in association with M. D. Wink. The name is Broadway Tire & Supply Co., and headquarters are at 545-547 Broadway, Milwaukee. The firm will act as distributor for Portage tires and conduct a complete tire repair shop.

**Handling Ride-Over Spring Lubricators**—The Wadhams Oil Co., 215 National avenue, Milwaukee, Wis., a large distributor of oils and greases, has taken over the sale of the Ride-Over spring lubricators, invented by Percy C. Avery, of Milwaukee. The lubricators consist of thin strips of fabric impregnated with graphite compound and are slipped between the spring leaves by means of a spring spreader without disturbing the clips or spring assembly.

**Hudson and Packard Agencies Combine**—The Hudson and Packard lines are now consolidated in the Northwest, the change affecting the Pacific Car Co., in Tacoma, and the Northwest Auto Co., in Seattle. This is probably the largest deal ever closed in the State of Washington. Arthur P. Nute, formerly of the Packard company, will personally direct the Seattle force, which consists of Secretary Harry E. Mills and Salesman Berg, while Robert Atkinson will have charge of the Hudson sales department. Lou Ross will have charge of the Pacific Car Co. in Tacoma.

The Northwest Auto Co. controls the entire western Washington field, with the exception of Tacoma, for the Packard car and represents the Hudson in King, Snohomish, Skagit and Whatcom Counties. In exchange for the Seattle territory, the Pacific Car Co. has taken the Tacoma field and with it the Packard organization in Tacoma.



# Accessories for the Automobilist

**STEWART-WARNER Ford Special**—A speedometer for Ford cars, with all the necessary fittings for installation, and selling for \$12, has just been announced by the Stewart-Warner Speedometer Corp., Chicago, Ill.

As shown in Fig. 1, it has a rotating speed dial with 60-mile capacity, a 10,000-mile season and 100-mile trip register. The figures are in black on white. The trip register can be rapidly reset to a tenth of a mile.

The highest grade construction is followed throughout. Jeweled bearings, polished steel magnet, silver etched dial, and face and case finished in deep jet lacquer are used.

**Legalight Reflector**—The Legalight Reflector, Fig. 2, is a parabolic reflector which is to be placed inside the ordinary headlamp for the purpose of obviating the glaring rays. This reflector is similar in shape to the big one, but smaller in size. It is tilted downward at such an angle that although it casts its rays forward, the upper edge of the light never raises above a line parallel with the ground, thus avoiding all possible glare, while the lower edge strikes the ground very close to the car.

This reflector is built with a bracket at its back, set eccentric to the reflector, and so designed that a bracket or ferrule slips over the Ediswan socket ordinarily used in automobile headlamps. When the smaller reflector is in place the bulb is latched into its bayonet joint, and the socket is then slipped backward by the ordinary focusing device and locked in such position that the small reflector's bracket or ferrule is held between the lamp and the big reflector. This holds it permanently in place, preventing any turning, slipping, or joggling.

It is claimed for this device that it will absolutely eliminate the objectionable glare of electric headlamps and will throw all of the light from the headlamps on the street.

The Legalight Reflector is a very simple patented device which can be put on the headlamp or taken off with great ease and facility and is guaranteed to do what is claimed for it.

It is made by the Legalight Mfg. Company, 1503 Bryant avenue, New York City, and is retailed at \$2.50 per pair.

**Pasco Side Lights**—The features claimed for these lights, Fig. 3, are beauty and ease of attachment. For city driving they can be used in place of the headlights and are brilliant enough to be relied upon when the headlights fail.

For ordinary purposes, Pasco side-lights are provided with 6-volt, 4 candle-power Mazda bulbs and the energy can be obtained from a storage battery or dry cells. The price is \$6.



Fig. 1—New Stewart Ford speedometer

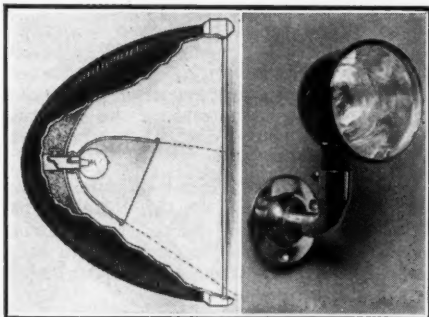


Fig. 2—Left—Legalight reflector to throw the rays to the ground

Fig. 3—Right—Pasco electric side lights

**Economy Junior Welding Outfit**—A complete welding outfit, Fig. 4, which lists at \$250 is produced by the Economy Welding Co., Kansas City, Mo. It is designed for the garage man and is capable of welding all car parts. It will cut steel up to 1.5 inches thickness.

The equipment includes: An oxygen generator which consists of a steel stor-

age tank, 16 by 48 inches, and a steel wash bottle, both built for 200 pounds working pressure; a relief valve, regulating valve, pressure gauges and hose; a steel retort; acetylene pressure generator operating at 20 pounds pressure; torch with seven welding tips and 3 cutting tips; three 15 foot lengths of 1/4-inch hose.

**Elyria-Dean Lighting System**—An electric lighting system, Fig. 5, embodying a generator, storage battery and combined switch, current indicator and connecting rack, has been brought out to meet the requirements of small motor cars, by the Dean Electric Co., Elyria, O.

Its capacity has been selected to just carry the lights of small and medium-sized cars with a comfortable margin of safety. Consequently the bulk and weight have been reduced to a minimum, and by fitting a dimming attachment on the headlights, the sidelights are done away with. This, in connection with the adoption of the single wire system, has reduced the number of wires to four.

The dynamo output is controlled by a special arrangement of windings and by the particular design of the magnetic field. No moving parts are used. The reverse current cutout is incorporated in the dynamo. The current flow is shown by an indicator on the dash switch. The lamp bulbs recommended for the headlights require 2 amperes each, and that for the tail light .42 ampere. Therefore a compact and inexpensive battery can be used, one of 35 ampere hours capacity, figured on a 5-hour discharge rate. This outfit is small enough for cyclecars. The price is \$32.50.

**Shaw Wrench**—A wrench that will turn steel rods, round-headed bolts, pipes,

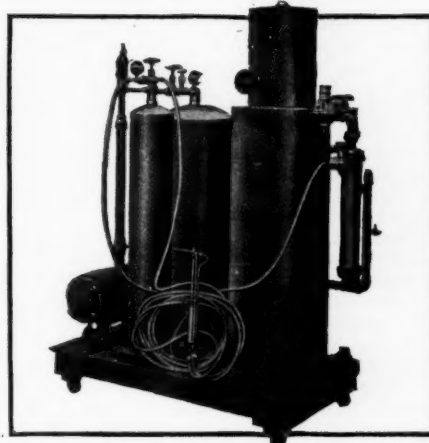


Fig. 4—Economy Junior welding outfit

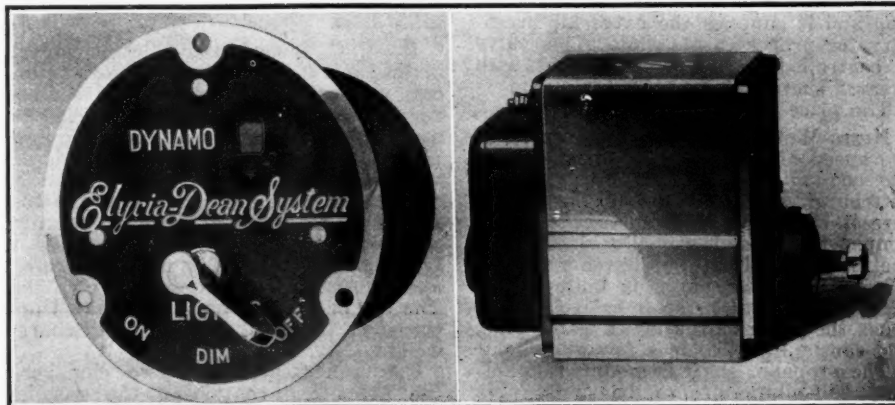


Fig. 5—Elyria-Dean lighting outfit for small cars. Left—Switch. Right—Generator

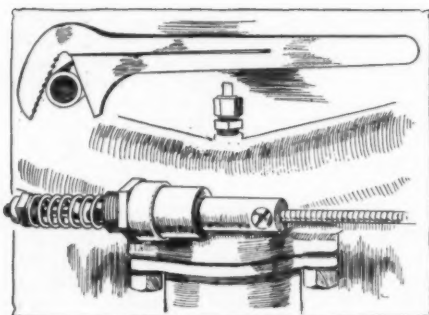


Fig. 6—Top—Shaw wrench. Bottom—Handy carburetion controller

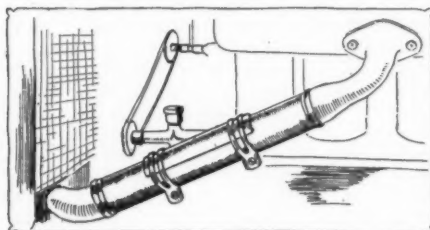


Fig. 7—Kern water circulator

square or hexagonal nuts, one that will serve for almost any kind of work any wrench can be called upon to do, is made by the Shaw Propeller Co., 131 State street, Boston, Mass.

The feature of the wrench, Fig. 6, is its simplicity. It is made from a single piece of steel, will grip any size piece without requiring adjustment, and it will release without sticking.

It is made in three sizes, 8, 10 and 15 inches, and retails at \$.65, \$.80 and \$1.

**The Handy Carburetion Controller**—To supply a perfect mixture with varying motor temperature and speed is the object of the device, Fig. 6, put out by the Crary Co., 650 Woodward Ave., Detroit, Mich. It consists of an automatic air valve that is attached to the manifold and which can be controlled from the steering post by means of a small lever and Bowden wire cable.

Most carburetors are adjusted so that the motor will run well before it reaches its normal running temperature of about 180 degrees Fahrenheit, therefore when this temperature is reached the motor is receiving too rich a mixture, first because of the heating of the air which causes a reduction in charge weight and, second, because the heat decreases the viscosity of the gasoline, causing it to flow more readily.

After the motor has become warm, the automatic air valve is brought into action and it supplies the extra air necessary for proper carburetion. This valve is controlled by a spring so that with greater suction it opens wider.

The price complete is \$7.50.

**Kern Water Circulator**—To increase the speed of circulation of the water in the cooling systems of Ford cars the Pittsburgh Mfg. Co., Pittsburgh, Pa., offers its Kern water circulator. It is a simple two-bladed propeller located in the intake manifold and driven from the fan pulley. The pump is built into a section of seamless steel tubing, which takes the place of the lower water pipe, and can be installed in a few minutes.

The propeller shaft is mounted on hollow, self-oiling bronze bearings. No packing is used. A hinged pulley clamps over the flange of the fan pulley and a

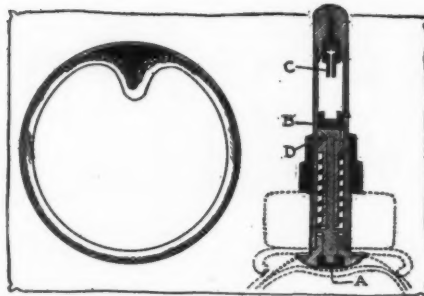


Fig. 8—Left—Searle unburstable inner tube

Fig. 9—Right—Gem safety tire signal

spiral wire belt runs over to the pulley on the pump shaft. The price is \$7.50.

**Searle Unburstable Inner Tube**—The Searle inner tube, Fig. 8, which performed so well recently in a test from New York City to Garden City and back, a distance of over 40 miles, when 13 taxicabs, each with two tubes in shoes that had so many holes in them that they would have been useless, will relieve the motorist of all anxiety as far as tire trouble is concerned.

This tube has several interesting features. It is capable of withstanding 100 pounds of pressure with safety due to the fact that two layers of canvas are incorporated in the tube walls. In addition, the part of the tube next to the tread of the tire is made very thick, to prevent puncture. It would take a nail over an inch long to penetrate the inner wall of the tube at the center. Thus it is seen that it is proof both against punctures and blow-outs. The thickened portion of the tube preventing punctures and the canvas withstanding the internal pressure and preventing blowouts when the casing gives way.

**Gem Safety Tire Signal**—By using the signal manufactured by the Safety Tire Signal Co., Boulder, Col., the motorist is notified when the pressure in the tube drops below 25 pounds, by the explosion of a percussion cap.

The signal, Fig. 9, does not interfere with the tire valve as it can be installed anywhere on the rim, the wall of the tube communicating the pressure to the foot A. When the pressure drops the hammer B is released and impelled by the spring, flies up and sets off the cap which is located on C. The cap D is removable so that a new cap can be substituted without difficulty. When the pressure drops, the member A moves down and releases the catch D, after which the hammer sets the cap off.

Two styles are manufactured, one for ordinary rims and another for demountable rims, the latter style having a separate foot.

**R. O. C. Superheater**—Better vaporization, less carbonization, increased economy and power are the features claimed for the R. O. C. superheater, Fig. 10, marketed by the National Economic Supply Co., 1777 Broadway, N. Y. This device heats the fuel before it enters the carburetor, with the result that the fuel vaporizes readily and forms a mixture that does not contain any particles of liquid and in this way a more perfect mixture and more power are obtained. The air in the charge is not heated and therefore there is no reduction of charge weight.

The superheater has two chambers, the inner one containing the gasoline and the outer the exhaust gases, which are led from the exhaust pipe through a

.375-inch pipe. The exhaust inlet is tapped into the manifold as near to the motor as possible and the outlet is connected with the atmosphere.

The gasoline chamber is large and is provided with a baffle which directs the flow towards the bottom. Thus the chamber acts as a settling chamber, removing water and dirt. A pet cock is provided at the bottom for draining. The price is \$5. An exhaust control valve and couplings are supplied for \$2.50 extra.

**Crimo Carbon Remover**—A liquid for removing carbon from the cylinders is manufactured by the Crimo Co., St. Joseph, Mo. It is sold in gallon cans at \$4. It is stated that one pint of the liquid fed into the air passage of the carburetor, every 500 miles, while the motor is running, will keep the motor free from carbon. Before using Crimo, the motor must be operated until thoroughly warm, then the liquid is fed in very slowly and the motor operated until all traces of smoke have disappeared.

**Isbest Non-Blowout Tube**—By making the top wall of the tube very thick and reinforcing it with endless non-stretchable cables, the Greensburg Tire and Rubber Co., Greensburg, Pa., claims to have an inner tube that will not blow-out under ordinary conditions of service. Just enough stretch is allowed by the cables to enable the tube to fit the shoe.

**Apollo Electric Horn**—An electric horn Fig. 11, that is well-finished yet low in price has recently been brought out by the Automobile Supply Mfg. Co., Brooklyn, N. Y.

The Apollo, as it is called, produces a tone that is penetrating but pleasing; that is, the kind of sound that warns without startling. A guarantee of three years satisfactory service is offered. Two sizes are made, the larger selling for \$6, and the smaller for \$5.

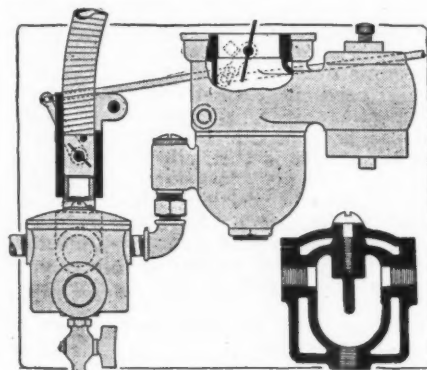


Fig. 10—R. O. C. vaporizer

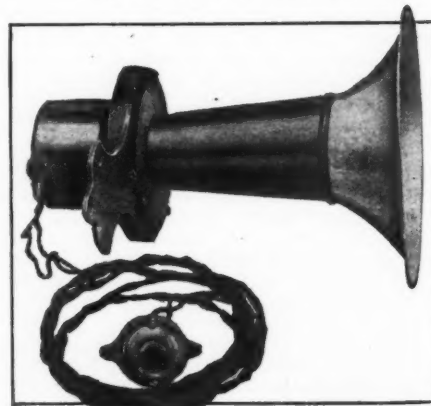


Fig. 11—Apollo electric horn